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UNITED STATES NAVAL INSTITUTE PROCEEDINGS

Vol. 55 DECEMBER, 1929 No. 322

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United States Naval Institute
Publication Office: Menasha, Wisconsin
Editorial and Business Office: **Annapolis, Maryland**
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The pages of the PROCEEDINGS, of which this issue is a fair sample, cover a wide range of interesting subjects, accompanied by beautiful illustrations, pertaining to the sea. The contributors, both foreign and American, officers and civilians, many of whom are distinguished in their specialties, so write as to interest both the associate and regular members as well as lay readers. In addition to the leading articles in the main body of the magazine, there are departments under the following headings: Discussions, Professional Notes, Notes on International Affairs, Book Reviews, and Secretary's Notes. For further information address Secretary-Treasurer.

ANNUAL DUES $3.00 (*Including Proceedings*)

Address SECRETARY-TREASURER, U. S. NAVAL INSTITUTE
ANNAPOLIS, MD., U.S.A.

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The writers only are responsible for the contents of their respective articles.

Editor, Captain R. C. MacFall; Assistant Editor, Lieutenant Commander A. H. Rooks.
Published monthly at 450 Ahnaip St., Menasha, Wis.
Executive, Editorial, and Business Offices, U. S. Naval Institute, Annapolis, Md.
Advertising Department, McGill Building, Washington, D.C.
Entered as second-class matter at the post-office at Menasha, Wis., April 4, 1922, and at the post-office at Annapolis, Md., under Act of August 4, 1912. Acceptance for mailing at the special rate of postage provided for in section 1103, Act of October 3, 1919, authorized March 13, 1922.
Membership dues (including PROCEEDINGS), $3.00 a year.
Subscription rate, $5.00 a year. (Foreign postage, $1.00 extra.) Single copies, 50 cents.

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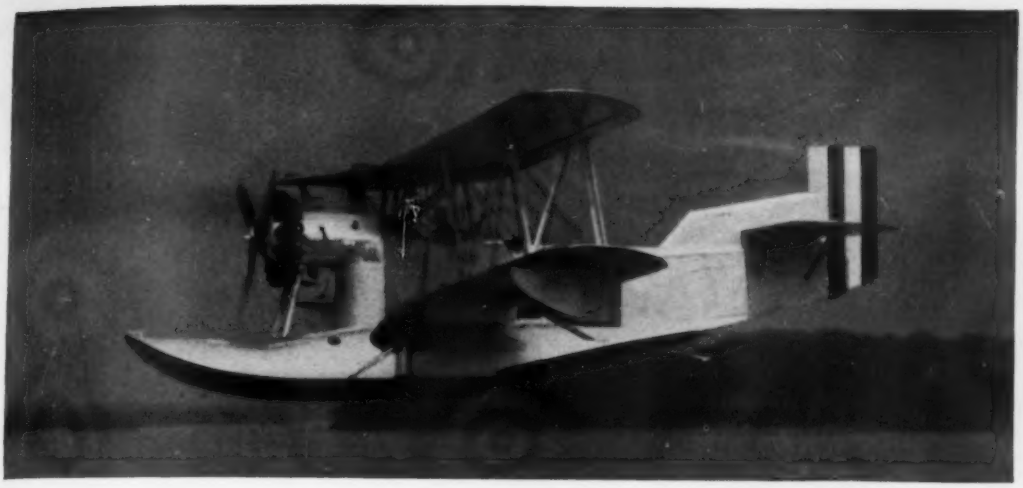

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Bates flies because he's keen about it, and because it saves him good business days every month. When he asked me to go to Boston with him in his Sikorsky Amphibion I broke three dates to do it.

We slid into one of the most comfortable pilot's cockpits I've ever sat in. Roomy. And you can adjust the seat to suit yourself. The engines were warm and Bates picked her off the water with scarcely any run at all. I noticed she climbed fast, and very easily. He circled the Bay and put her on her course.

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Bates glanced at me and swung the control wheel over into my hands.

I seldom fly large ships, and I thought of the "S-38" as something a bit difficult to handle. I got the surprise of my life. She controls easily and naturally and is absolutely alive with reserve capacity to do all you ask of her. When I set her down in Boston Harbor, he smiled approvingly.

You can guess how much Bates thinks of that ship. She'll do more than 125 miles an hour, climb to 18,000 feet, and fly and maneuver on either engine. His passing over the controls was the finest compliment I've ever had.

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WE BUILD A NAVY

By LIEUTENANT COMMANDER HOLLOWAY H. FROST, *U. S. Navy*

xvi+502 pages, 33 full-page illustrations, $4.00 postpaid

The following are typical of the reviews of this book:

He patterns after Theodore Roosevelt and Admiral Mahan, both of whom found something to criticize in operations of the War of 1812. Enthusiasm for the service the author admits. He is sometimes "colorful," but refrains from gasconade.

The author is sound when he says of Paul Jones: "He had founded the tradition of the United States Navy—the only asset which our Navy had when reëstablished in 1798." What an education to junior officers he has been ever since!

There were other fine seamen, other real heroes, to come in the period the author sets himself: John Rodgers, who, calling his crew to quarters at the opening of the War of 1812, addressed them:

"Now, lads, we have got something to do that will shake the dust out of our jackets. War is declared. We shall have another dash at our old enemies."

Stephen Decatur, of Tripoli and Algiers, a captain at twenty-five; insatiable Edward Preble, who, to Decatur's report that he had captured three of the enemy's gunboats, replied: "Three, sir, where are the rest of them? Why have you not brought them all out, sir?" The devoted Richard Somers, who blew up the *Intrepid*, perishing with her rather than yield to the enemy; William Bainbridge, whose gunners of the *Constitution* made a total wreck of the *Java;* and Thomas Macdonough, who immortalized himself in the Battle of Lake Champlain and of whom Roosevelt has written that he "feared his foes not at all but his God a great deal." Let Oliver H. Perry of the Battle of Lake Erie not be forgotten: "You will have to engage the enemy to leeward," reported his sailing master, Taylor, to which the impatient Perry replied: "I don't care, to windward or to leeward, they shall fight today."

A readable book, and honest piece of work, claiming not too much for the old Navy, and generous to the foe. It should be in the hands of every young gentleman at the Naval Academy. He will find it an inspiration. HENRY E. ARMSTRONG in the New York *Times*.

There are always difficulties about writing early American history, when brought into comparison with the larger movement of the world. The events in themselves are often petty and insignificant and have to be recognized as such. And the very insignificance of the main events exaggerates the tendency to overestimate the importance of minor details.

But Commander Frost has deeply and truly seized the two fundamental principles that can save such a history as his from the defects I have suggested and can give it larger significance as well as dramatic interest. The first of these principles is to stick to the main issues involved and to show that events, comparatively minor in themselves, are important from their permanent historical bearing.

Still more important, and what gives its chief richness and interest to Commander Frost's book, is the emphasis upon men. It is not numbers, it is not equipment, it is not even victory that makes the human interest of war, on sea or land; it is the fact that men fight it. The battles on the Lakes were not Trafalgar, but the heroism of Lawrence carries us out of ourselves like the heroism of Nelson. Above all, the vigorous, masculine, dominating figure of Paul Jones flares and glows through Commander Frost's earlier pages with a dramatic picturesquesness that would give life to any book.

GAMALIEL BRADFORD in *The Book League Monthly.*

This is an old-fashioned tale of the sea; a tale of frigates and brigs and ketches and schooners and privateers and fire ships; of cutting-out expeditions and hand-to-hand fights with cutlasses and one-shooter pistols; of perfectly stunning victories by young Americans; of triumphs over the elements of wind and storm and tide, coincidentally with triumphs over hostile men.

When one reads Frost's account of what Jones did, one feels inclined to doubt it. What Frost says Jones did seems quite impossible. How could one little man, commanding only a very few miserable, purchased vessels of ill-sorted kinds, with only half-trained officers and half-mutinous crews—how could he keep the wonderful British Navy all agog so long and finally sink H.M.S. *Serapis* in single combat? Clearly he could not. But he did!

All of Barbary Coast campaign presents a moving picture to any one of even average imagination, as stirring and colorful as any ever shown on any screen; immeasurably wider in scope, immeasurably greater in depth.

He (Frost) shows that the British activities on the Great Lakes were intended to coöperate with others at the mouth of the Mississippi.

If the British had succeeded, if Perry and Macdonough had not defeated them on the Great Lakes, and if Jackson had not then defeated them at New Orleans, the United States of America would ever since have been, and would now be, a narrow fringe of little states stretching from the vicinity of Boston to the northern end of Florida. REAR ADMIRAL BRADLEY A. FISKE in New York *Herald-Tribune.*

To landsmen—a thrilling tale of adventure at sea; to Navy men—a readable text on the value of offensive attitude in naval warfare; to statesmen—a lesson on the advantages of a vigorous national policy; and to all Americans—a brilliant exposition of the vital necessity for a Navy and of the paramount importance of its morale, reputation, and prestige.

Written in an easy flowing, delightful style, that holds the interest of laymen and explains clearly to the technician, Commander Frost's book is a distinct contribution to naval literature.

Army and Navy Journal.

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HEADING FOR PORT

A "Black Ball" packet driving through a snowstorm on the North Atlantic. Such ships as these were the passenger liners of the "Days of Sail."

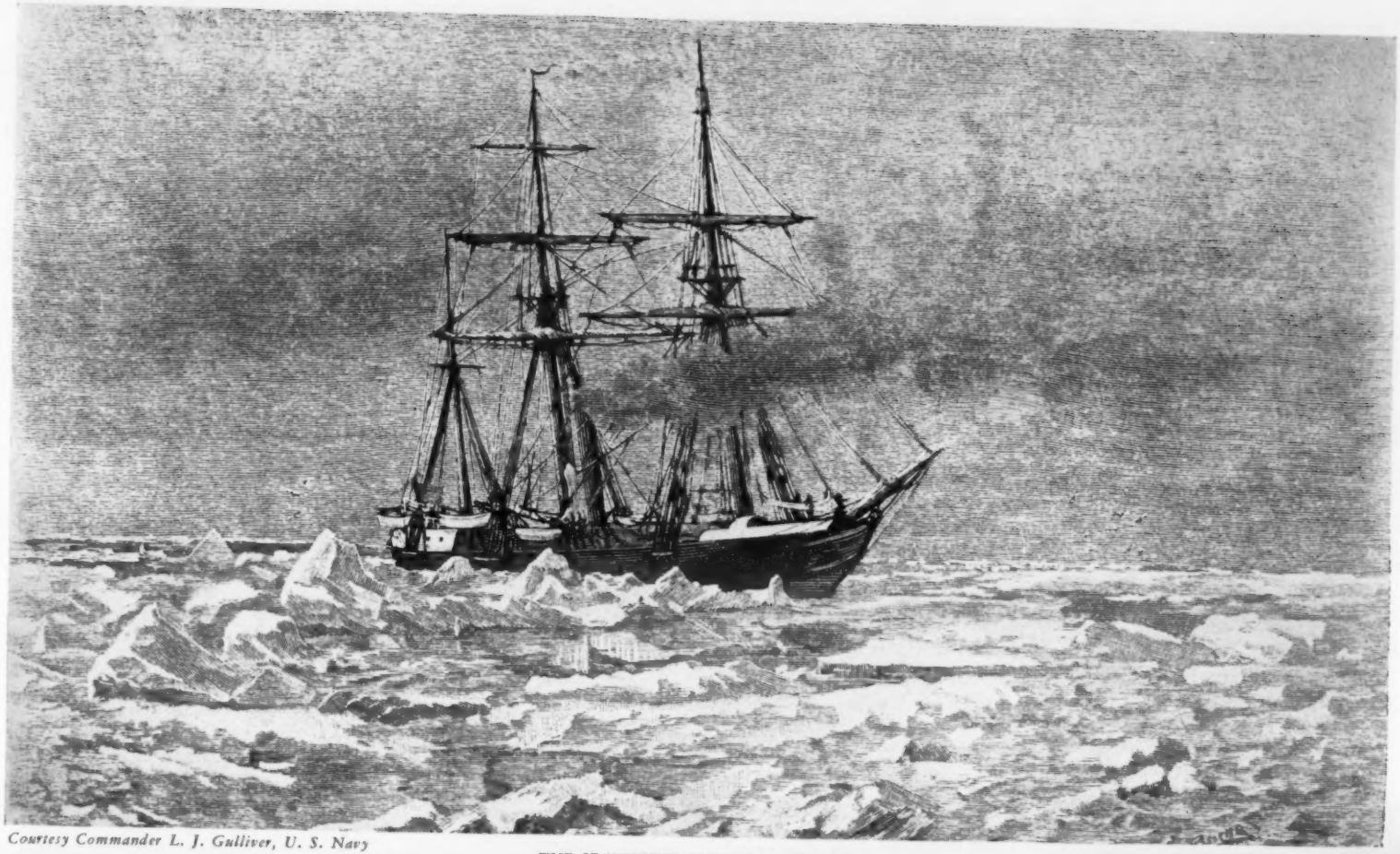
Courtesy Mrs. Emma De Long

COMMANDER GEORGE W. DE LONG, U. S. NAVY
1844-1881

Courtesy Commander L. J. Gulliver, U. S. Navy

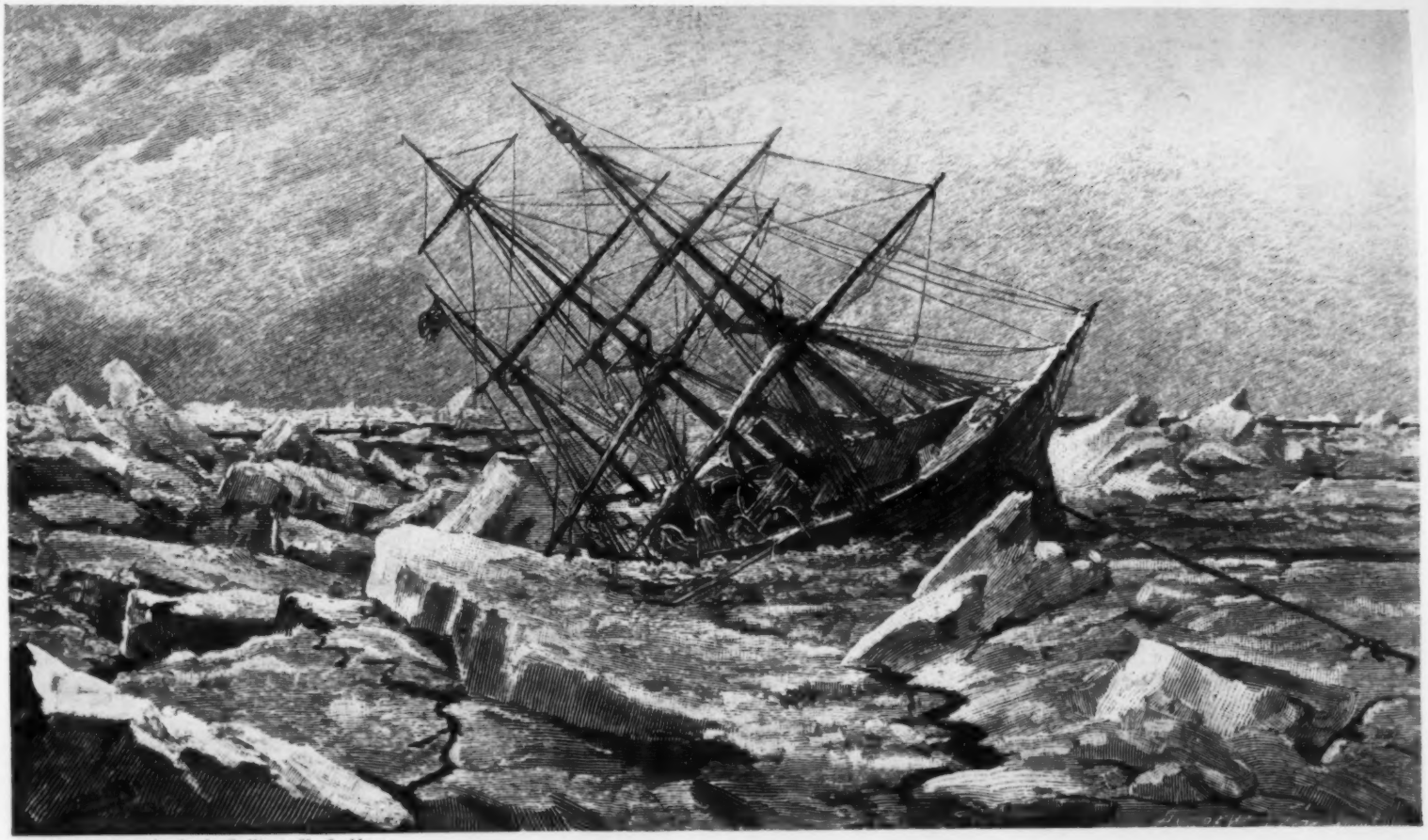
THE *JEANNETTE*

Off Mare Island Navy Yard, California, in 1879, just before starting on her Arctic expedition. The *Jeannette,* formerly the English-built *Pandora,* had previously made two successful voyages to the Far North.



Courtesy Commander L. J. Gulliver, U. S. Navy

THE *JEANNETTE* ENTERING THE ICE



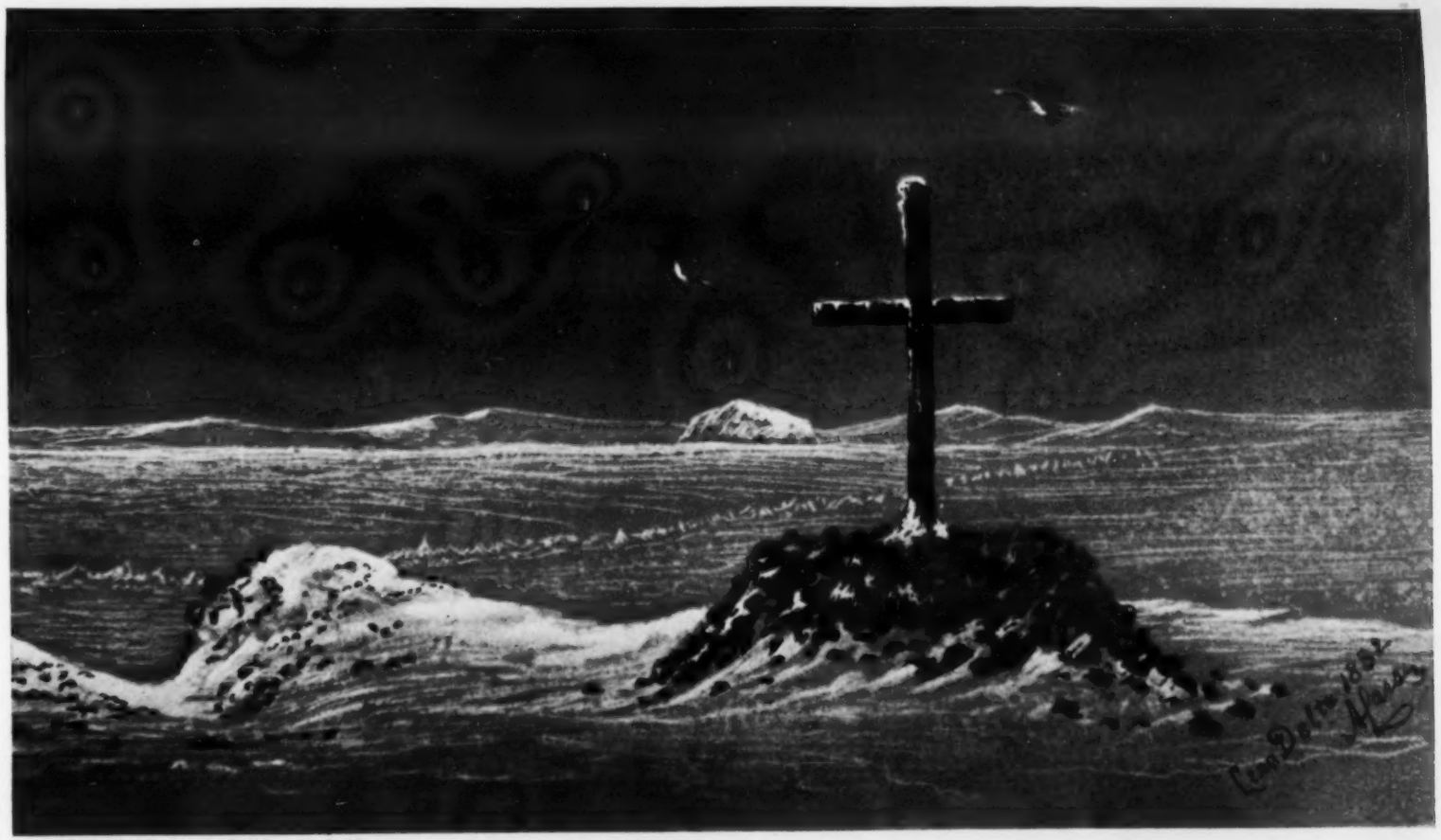
Courtesy Commander L. J. Gulliver, U. S. Navy

THE SINKING OF THE *JEANNETTE*

Courtesy Commander L. J. Gulliver, U. S. Navy

THE CREW OF THE *JEANNETTE*
Dragging her boats over the ice.

THE CREW OF THE *JEANNETTE*
Dragging her boats over the ice.



Courtesy Commander L. J. Gulliver, U. S. Navy

CAIRN ERECTED BY MELVILLE
To protect the bodies of De Long and eleven other officers and men of this ill-fated expedition.

Courtesy Commander L. J. Gulliver, U. S. Navy

MEMORIAL ERECTED IN WOODLAWN CEMETERY, BROOKLYN, NEW YORK

By Mrs. Emma De Long in memory of her husband, Commander George W. De Long, and five of his shipmates.

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Kingsford-Smith and his companions over Suva, 1928

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UNITED STATES
NAVAL INSTITUTE
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Vol. No. 55, No. 12 DECEMBER, 1929 *Whole No. 322*

Heroic De Long *and* His Arctic Followers

By COMMANDER LOUIS J. GULLIVER, *U. S. Navy*

FOREWORD

By MRS. EMMA DE LONG, *Widow of Lieutenant Commander George W. De Long, U. S. Navy.*

In July, 1929, fifty years had rolled by since my husband, Lieutenant Commander George W. De Long, steamed out of San Francisco harbor on the U. S. S. *Jeannette,* with high courage and high hopes.

For him these hopes were not realized, and he died a disappointed man, patiently, nobly accepting his cross.

But time has changed the world's opinion of the results of his expedition, and now his achievement looms large as a success, and not as a tragedy and a failure.

It is now recognized that he was the pioneer through Bering Strait, that he discovered there was no continent to the north of Siberia—that there was no open Polar Sea. His was the first lengthy Arctic expedition whose men escaped the scurvy and were in good health when their ship sank, after two years of drifting with the ice currents, and were then able to make a march of over five hundred miles of shifting ice to the coast of Siberia, with all their impedimenta.

He was therefore a great pioneer in showing how the health and spirits of an isolated expedition could be conserved through a period of years.

The whole story of the *Jeannette* voyage made it clear that there was available a new method of exploration—that of drifting with the ship. It was therefore upon the *Jeannette* voyage that Nansen built all the plans that led to his great success, which belonged in considerable part to De Long.

In conclusion, it is believed by Arctic explorers to be a certainty that a study of the history of Arctic exploration will the more enhance the credit of De Long, the more accurate and thorough it becomes, until his expedition will eventually stand among the three foremost that have ever been commanded by Americans, and among the six or ten most significant northern expeditions.

Much was added to the stock of the world's knowledge; a gain was made in the solution of the Arctic problem.

Sacrifice is nobler than ease, and the world is made richer by this gift of suffering.

And now I am asked to add as a message to the midshipmen, officers, and friends of the Navy, a few words about my feelings and devotion to my husband's memory.

This I cannot do in a better or more interesting way than by quoting from my husband's last letter from St. Lawrence Bay, Siberia. It will explain everything I may have felt and done for his memory.*

* The Honorable William E. Chandler, former Secretary of the Navy, is the only person other than myself who has ever seen or read the following postscript written a half century ago.—Emma De Long.

P.S. The mail must now be closed. . . . .
Dr. Ambler was particular to come and ask me to send his kindest regards to you.
With God's help I shall yet do something to make you proud of bearing your husband's name.
Every chance I have of sending you a letter I shall seize.
Do not give me up for I shall one day or other come back to claim my precious wife and child.
May God keep and bless you both wherever you are and save your love for me. . . . .

Your loving husband,
GEORGE W. DE LONG
5 P.M. August 27th

A GREAT variety of men have set out to explore the unknown regions of the earth enclosed within the Arctic Circle. The first attempt was made in 1553. Plain sea captains, doctors, scientists, naval officers, and even a few adventurers have gone forth on the great quest, some seeking the Northwest Passage, some the highest latitude, and others determined to plant their feet on the polar axis of the earth. But none of these have left a record so marked with smashed ambitions, heroism, and bitter suffering as the immortal Lieutenant Commander George W. De Long, U. S. Navy, commanding the Arctic steamer *Jeannette*, sailing out of San Francisco fifty years ago. De Long aspired not only to surpass the highest latitude attained by any Arctic explorer of his day, but he believed the Pole itself might be his if all went well. He sailed into a sea of silence. Two years and six months dragged by without a message from the *Jeannette*. No news, not even a rumor, and just when De Long's anxiously waiting countrymen had about given up all hope, there came out of Siberian Russia a startling message that told the end of the *Jeannette*.

At the time De Long sailed north, the highest latitude which had been attained was 83° 21′ north latitude, or 399 miles from the Pole. Many of those who had gone Arcticward before him had suffered bitterly from hunger and exposure, and some had found not glory, but lonely deaths in the Polar snows and ice.

A new and untried route to the Pole was the somewhat slender basis of De Long's hope and enthusiasm, the route via Bering Strait, that narrow gateway to the Arctic Seas between Alaska and Siberia, and thence due north, aided and pushed, he hoped, by the Japanese Current which he believed carried warm water from the Pacific in a stream that would make it possible for the *Jeannette* to work her way through the great polar ice fields. Captain De Long also thought he would get northerly momentum and more open water in the spring and summer from the effect of the warm water discharging from the mouths of the great Siberian rivers.

Holding this belief, in which he was joined by the best-informed polar explorers and scientists, Captain De Long searched far and wide for a vessel that would meet the requirements of an Arctic expedition—a ship possessing both sail and steam power that was built stoutly enough to withstand the pounding and crushing effects of the polar ice fields. Finally he obtained the English-built *Pandora*, which had successfully made two voyages to the Far North. At the Mare Island Navy Yard in California she was further strengthened, thoroughly refitted and renamed the *Jeannette*.

James Gordon Bennett, owner of the New York *Herald*, who was always ready to back expeditions of discovery and exploration, provided the funds for the *Jeannette*. The officers and crew to man the ship came from the United States Navy. The vessel thus became a part of the United States Navy, operating under naval regulations.

The *Jeannette* was small—only 142 feet long—but very strongly built, as she proved later in resisting the merciless pounding and crushing of the polar ice pack. She was square-rigged and had a good steam propelling plant for use as an auxiliary to her sail power and for forcing her way, when opportunity offered, through the ice. Ample equipment of boats, stores, and food for three years was carried, as well as a full supply of instruments for scientific observation and study. In Alaska, the first stop, forty Alaskan dogs were secured for sledge work, but as things turned out they had little chance to show their worth. Some of these faithful dogs like Kamchatka, Snoozer, and Hard-Working-Jack, have left enduring names in polar history.

Captain De Long seriously considered taking a balloon as a part of his equipment —of the captive type—to provide a high-elevation observation point, to enable him the better to pick out open leads of water through which he hoped to work his way through the vast ice fields.

The officers and crew that Captain De Long selected, numbering thirty-three persons, were a magnificent lot—the flower of the Navy. No men ever gave a finer exhibition of heroic devotion to duty, cheerfulness under the relentless battering of the Arctic ice, patient fortitude, and loyalty to their captain and to each other.

De Long was a sterling leader of men, a brave officer, a considerate shipmate, and a man whose courage and faith never faltered during the bitter cold and nearly hopeless imprisonment in the Arctic ice and the retreat that followed. Next to De Long came George Melville, the *Jeannette's* chief engineer, who met and conquered every danger that almost daily threatened the safety of his ship and his messmates. Doctor Ambler guarded the health of his men so carefully and provided such superior sanitary and hygienic living conditions on board the ship that the *Jeannette's* people came through their twenty-two months' imprisonment in the ice without a single case of scurvy or other impairment of health.

Among the crew Ice Quartermaster William Ninderman proved himself to be a man of almost superhuman endurance. When other strong men fell from exhaustion, brought on by hunger and cold, Ninderman carried on, ever loyal and faithful to his captain. Alexy, an Alaskan Indian, saved his shipmates time and again by his amazing skill as a hunter. With his Remington rifle, good Alexy went out and brought back game for food at the most critical junctures when his comrades lay unable to move from hunger and exhaustion. Ah Sam, the quiet, humble Chinese cook, stoical, uncomplaining, true, stuck to his captain to the very bitter end.

As July 8, 1879, the sailing day of the *Jeannette,* drew near, intense interest and excitement gripped the people of our country and people abroad as well. With the salutes from the San Francisco forts roaring in their ears and amid the screeching of whistles and the waving of farewells from an escorting fleet, the brave little *Jeannette* sailed out of the Golden Gate and headed north. Mrs. De Long, the captain's wife, was the last to leave the ship, and before a boat brought her ashore she presented the *Jeannette* with a small silk American flag that was later to see fateful scenes.

The polar route via Bering Strait chosen by Captain De Long led, as he well knew, through a region where whaling ships had frequently been frozen hard and fast in ice from which they never escaped, but when he sailed north from San Francisco he little realized the extent of the vast icy prison lying inside the Arctic Circle that awaited the coming of the unsuspecting *Jeannette.*

Northward from San Francisco the confident and eager expedition sailed, stopping first at Unalaska in August. A few days later, after touching at St. Lawrence Bay in Eastern Siberia, all hands waved farewell to civilization. There were only a few days of freedom for the *Jeannette* once she entered the ice. With swift encircling motion the heavy floes surrounded the ship and almost in the twinkling of an eye the expedition that started so hopefully was completely imprisoned by fields of ice as far as the eye could see. Thus, on September 6, less than two months out of San Francisco, the *Jeannette* was locked in by tightly packed floes that, as winter came on and the northerly current carried ice and ship along together, froze more and more, reaching a thickness of sixteen feet. The *Jeannette* was totally unable to move ahead or to retreat; her sail and steam power had no more effect on the ice than the waving of a feather.

Locked hard and fast in the frozen wastes! Only those who have seen the Arctic can know the dreary desolation that moans monotonously throughout the years —a mighty, gaunt, blanched beggar. The dominion of the ice is not disputed there.

The imprisonment of the *Jeannette,* beginning September 6, showed no probability of surcease. With the coming of the winter of 1879-80 the pack grew thicker and the thermometer fell lower. The little *Jeannette,* immovable in her icebound home, was swept hither and thither as the mighty fields of ice moved through every point of the compass under the conflicting forces of wind and ocean currents. Throughout the first eighteen months, the *Jeannette* moved as the ice moved, over 1,300 miles, but at the end of this long time she was only 220 miles nearer the Pole.

Adding to the depression of imprisonment, the long Arctic nights gave Captain De Long and his men plenty of carking cares. No child lost and alone in a deep,

dark forest ever heard such terrifying sounds as did the *Jeannette's* people as the ice roared and thundered and cracked. Great ice bullies fought each other with the little wooden *Jeannette* in between them, unable to escape and not strong enough to resist, and as they crushed and smashed each other she could only lie there and tremble and creak in fear of her life. Such was the dose meted out almost nightly to the helpless crew. Many a night saw them rushing on deck as their home seemed no longer able to hold together.

And yet all was not care and desolation. Men rise above the mighty efforts of nature to maim and destroy them. The officers and men engaged daily in hunting. Hardly a day passed without the alarm, "Bear"! and the chase was on. The hunters did not get all the bears that they chased—some of these burly giants outdistanced the men; others, wounded, swam across wide open-water leads, or dove under the ice. Bears weighing nearly a thousand pounds were brought in and fresh bear steak was a luxury enjoyed by all hands. Seal, and occasionally walrus, were shot. Seal meat was also a much enjoyed delicacy.

Nature, too, was not always harsh to the *Jeannette's* men. At times the glorious and effulgent beauty of the auroral displays across the evening sky filled the men with awe. Wavering, gushing sheets of greenish-blue lights, from the ice horizon to the heavenly zenith, illuminated the ghostly fields of ice. The *Jeannette,* her spars and rigging greatly enlarged by a mantle of snowy white, completed a picture that made these imprisoned men forget for the moment their predicament.

Early in November the sun no longer showed itself above the horizon and the men realized that the loss of nature's greatest boon left them more desolate and alone than ever before. The renewed hope that comes to harrassed men with the coming of morning's light was no more. The Arctic sun that shines so fiercely in summer was to remain entirely hidden until February—more than ninety long days.

Christmas eve, 1879, found De Long and his men locked fast in the drifting pack, yet the crew, never long downcast, marched aft, and offering the greetings of the season, announced that a minstrel show awaited the coming of the officers to the crew's quarters.

The year 1880 was just 365 days of waiting and wondering for the men of the *Jeannette.* They were comfortable in body and their food was ample and satisfying. Yet their spirits were far from buoyant. Here was a body of resolute, hardy men, ready to dare, full of the fire of exploration, with their ship locked ignominiously in ice that intended never to relax its iron grip. Spring came and with it the end of temperatures that often fell to fifty degrees below zero. Then summer with melting ice, open leads of water, days of dazzling sunlight and nights that were as light as the winter days had been dark. Still the *Jeannette* lay imprisoned.

Under these conditions it was only natural that bitter disappointment should bear heavily at times on Captain De Long. One by one he had seen the collapse of his theories so carefully thought out; his ship was not able to work her way north; she was not being drifted north by the Japanese Current; no northerly push came from the Siberian rivers emptying their warm water into the Arctic basin.

The autumn came; the sun again vanished; early winter followed; the second Christmas in the relentless ice was at hand; and still the thirty-three men led by a captain who knew no discouragement did not surrender to the mighty force of Arctic nature—a force that seemed determined to do the *Jeannette* to death.

To prove that men's spirits rise higher as the elements lash about them more angrily, the *Jeannette's* crew put on a second and a better minstrel show as 1881 dawned. Costumed "actors" and "actresses", songs, dances, one-act plays followed by three rousing cheers for the *Jeannette,* began the sixteenth month in the ice.

The year 1881 brought other events more startling and vital than a good minstrel show. The ice took up a decided drift to the northwest, carrying the ship along at a rate varying from four to twenty miles a day.

With this movement there shortly came a tremendous thrill—the sighting of land, the first that the men had seen since November, 1879. The land turned out to be a barren, desolate island too far away to risk a landing by a walking journey over the

ice, but at least a discovery. This island was named Jeannette. Almost before the excitement had passed, a second island was discovered. A party headed by Chief Engineer Melville landed on this island, planted the American flag, and took possession in the name of the Great Jehovah and the United States. This was named Henrietta Island.

The ice was by now—June, 1881—moving rapidly, and had become ridged and broken into great hummocks that reared themselves into high, impassable barriers. Open leads of water suddenly appeared and as suddenly closed with a smashing roar.

The pressure of the ice against the *Jeannette* became more severe and on June 12, without warning, the floes around the ship parted and left the little vessel afloat for the first time for nearly two years, in a narrow lane of water. As suddenly as the ice had separated, as suddenly did it close in, and like the mighty jaws of a vise it caught the *Jeannette* and crushed her sides like an eggshell. Gradually filling with water, the little craft at last gave up the unequal fight and slowly sank to the bottom. The ice had won at last.

This was the end of the brave exploring expedition to the North Pole—thirty-three men and thirty-three dogs adrift on the ice six hundred miles from the nearest Siberian mainland, six hundred miles mostly of ice, partly of water.

Preparations for the retreat to Siberia had been completed through the foresight of Captain De Long in anticipating such a tragedy. All hands were comfortably sheltered in tents pitched on the ice pack. The expedition was organized into five working parties for the retreat over the ice. Food for ninety days was loaded on four sleds, each sled carrying about 1,100 pounds. Three boats to transport the people when open water should be reached were mounted on sleds. Each man in the crew, and as many of the officers as could be spared for this work were fitted to a hauling harness, which, in turn, was hitched to the sleds. The dogs hauled the medical sled. On June 17, the start south was begun.

Progress was tragically slow because of the tumbled, hummocky, ridged condition of the ice. Instead of each tent party hauling its own food sled and boat sled, the men were forced to concentrate on one sled at a time—advancing one sled and turning back and bringing up the next.

With seven sleds thus to advance, there were seven hauls to the south and six empty-handed return trips north; or to advance the expedition two miles south, each man had to travel over twenty-six miles of tumbled, rough ice, covered in places with deep, wet snow. Exhausting labor! It was decided to work at night to escape the intense and blinding light of the Arctic summer sun and to sleep in the daytime when its warmth would keep them comfortable and dry out their wet clothes.

The first stage of the retreat, beginning June 17 and ending July 27, covered ninety miles and brought the shipwrecked expedition to an island—another discovery. This they named Bennett Island in honor of the man whose generosity made the expedition possible.

During this forty-day journey, Captain De Long discovered to his great dismay that while his men were dragging their sleds laboriously south, they were actually at one time—having drifted—twenty-seven miles north of the point where the *Jeannette* was crushed. This terribly disheartening news he kept a profound secret.

The desperate work of hauling the sleds is best described in the captain's own words: "We have such terrific roads, such soft and deep snow and such ugly ice openings. Twenty-eight men and twenty-three dogs laying back with all their strength could only start our sixteen-hundred-pound sled a few feet each time and when it would plunge into a snow bank it was terrible work getting it out."

The ice shifted under their feet, separating them from their sleds and their provisions. Hardly had they commenced to move their loads over what seemed like a good route than the road broke up. The ice broke under them, or slid away from them, or moved to the right when their course lay to the left. Open leads of water compelled them to construct rafts of ice cakes. All this time Bennett Island lay in sight, tempting them by its solidarity and appealing to their desire for rest by its moss-covered hills and slopes. The actual landing on Bennett Island nearly cost the expedition many lives and all their food. The men had to jump from ice cake to ice cake that, in the grip of a rushing current, swirled

swiftly past the steep shores of the island.

Leaving Bennett Island on August 6, the expedition made its way alternately over ice and through water in the prescribed southwesterly course.

By mid-August two new dangers confronted them. The ice fields had given place to open water full of young ice that constantly threatened to smash the bottom planking of the boats. Food shortage, too, was a grievous worry; only tea, pemmican, and beef extract remained.

The turn for the worse in the retreat came on August 18, although no one realized it at the time. All progress was halted for twelve days by ice that was too thick to permit passage through it and not strong enough to support the boats. Thus the dwindling food supply was holed deeper with no compensating progress to the south —a state of affairs that all but cost the life of every man in the expedition.

On August 28 the boats had gotten to Faddejaw Island and on September 4 the expedition landed on Koltenoi Island after terrible labor and exhaustion from being thrown into the ice-cold water in making the shore. Little recuperation was possible here because of the reduced supper ration consisting of one pint of beef tea, six ounces of pemmican, and one pint of tea. In making Koltenoi Island the men travelled 250 bitter miles in thirty-five days.

Captain De Long and his men at this time were feeling severely the effects of the rough usage to which their bodies had been subject. Their feet and hands were badly swollen with chilblains.

Leaving Koltenoi Island, the three boats drove on under sail, landing on Semenovski Island on September 10. Here the faithful Indian hunter, Alexy, brought joy and a little comfort to his messmates by shooting a deer. The next day, Sunday, the ninety-first day since the *Jeannette* was crushed, saw Captain De Long holding divine service as usual, an observance he never failed in. Before departure a written record in a tin case was left on Koltenoi, the last paragraph reading: "We are all well, have had no scurvy and hope with God's help to reach the Lena Delta (Siberia) during the coming week. Have yet seven days provisions."

The journey from Semenovski to the Lena River delta beginning September 12, constituted the last stage of the great retreat—a retreat that was to see De Long and his men fighting it out to the bitter end against snow, exposure, and diminishing food supplies.

The three boats were hardly clear of Semenovski Island when a northeast gale came up that increased in fury as darkness fell. In the fight to keep from swamping, the boats became separated. The second cutter, carrying the gallant Lieutenant Chipp and old Ice Pilot Dunbar with their six companions, was never seen again.

The first cutter, commanded by Captain De Long, landed September 19 on the Siberian coast at one of the two hundred mouths of the Lena River, his boat grounding a mile and a half from shore, forcing the men to go into the icy water and carry their food, records, and tents ashore. Captain De Long here wrote: "We must now with God's help try and walk to a settlement, the nearest of which I believe to be ninety-five miles. We have four days supply of provisions." What a desperate task!

The Lena River delta where De Long and his party stepped ashore is one of the most desolate regions bordering on the barren Arctic. The land, low and swampy in July and August, freezes over in September and the icy ground, hardly able to support a man, is continually swept by gales and snow. No vegetation and scarely any animal life can exist there.

In such a land as this the first cutter's crew began the last fight to get home. The previous week had worked great torture on the men. Already four of them were groaning with pain and hardly able to hobble along through deep snow and over thin ice that let them sink through into the cold, boggy tundra.

Only a few miles a day was possible due to the gales, snow, and exhaustion of the party. What little headway was possible was hampered by the maze of rivers that met each other in all directions and forced the men to cross and recross ice that broke under them and sapped their dwindling strength.

Just as exhaustion from hunger was about to do them in, the faithful Alexy again saved his comrades by bringing in a deer. This deer meat, providentially obtained, postponed the seemingly inevitable.

On September 24, after resting three days

to enable the sick and disabled men to recover strength enough to go on, De Long and his companions again started south and by forcing the pace they made twelve miles. Two days later there remained for food only three scant meals and the last of the dogs, poor Snoozer. The next day fate tantalized De Long—Alexy shot a deer. Although this was a gift from God, it only palliated the great gravity of their plight. De Long, however, never gave up hope. He wrote: "According to my reckoning we are only four miles from Sagastyr. God grant that tomorrow will show that this is actually a settlement."

With Alexy's deer meat to give them some strength and a lessening of the pangs of hunger, the little band hung on. Their shelter on this day was a dirty hut unfit for a dog, but to these forsaken seamen a palace for the shelter it gave.

On Monday, October 3, the last of the deer meat had been eaten and De Long wrote: "There is no denying it; we are pretty weak."

Pretty weak they must have been now when decision was reached to shoot the last dog—Snoozer—and make him into a stew. That night De Long thought the end had come. The cold had been so intense that for the third successive night none of the sufferers were able to sleep. De Long wrote then: "If Alexy had not wrapped his sealskin around me and sat down beside me, I think I would have frozen to death." Good and faithful Alexy!

The next two days were desperate ones for De Long and his men. They were down to half a pound of dog meat a day. The tireless Alexy drew miraculously on his courage; weak and worn, he thought only of his messmates and captain, and made repeated searches for game.

The next day there came the first death from starvation. Seaman Erickson left a world that long since held nothing for him but pain and grief. Comrades in life and in death, his messmates summoned almost the last of their little strength to give Erickson an honorable burial. Captain De Long covered him with his own flag.

On Friday, October 7, the little band had breakfast on their last pound of dog meat. Even their tea was gone, yet they were about to start on a journey of twenty-five miles with nothing to eat but some dead tea leaves and two quarts of alcohol. De Long wrote here he trusted in God who had led them so far and would not suffer them to die of want now.

Two days later, Sunday, October 9, they started south, each man's food being but one ounce of alcohol. Before setting out, the captain read divine service. By midday the iron-bodied Ninderman and Seaman Noros, the strongest two of the whole ship's company, set out ahead, hoping to reach a settlement and obtain help for their helpless shipmates.

The next day no food remained and De Long and his men desperately resorted to eating the soles of their boots. Yet Alexy still was able to go out for game. De Long wrote here: "Alexy away again in search of game. Nothing for supper except a spoonful of glycerine. All hands weak and feeble. God help us."

The next day, October 11, the men were too weak to move. Cruel nature gave them no quarter and beat them mercilessly by a bitter cold blizzard that nearly snuffed out the little spark of life that remained. The tides of life were ebbing fast.

In desperation they made tea from Arctic willow roots, this being their sustenance on the one hundred and twenty-third day since their ship sank. De Long writes now: "We are in the hands of God. We cannot move against the wind and to stay here means starvation. All united in saying the Lord's Prayer. Living gale of wind—horrible night."

The next two days the men fought hard for life, gnawing on two old boots and drinking willow tea. The next day the magnificent Alexy died and was covered with the national colors he had served so well.

The record from this point on was brief. One by one the harassed and forsaken band of men died silently and without complaint.

Sunday, October 30, saw recorded the last dying words of Captain George W. De Long: "October 30. Sunday. One hundred and fortieth day. Boyd and Gortz died during the night. Mr. Collins dying."

The fight was over; the Arctic had won at last. De Long, with the faithful Dr. Ambler and the humble Chinese Ah Sam, succumbed a few yards farther south than the others. Their captain had outlasted the others. He was the nearest home. He deserved to be.

There is little else to be told. The more fortunate Melville, landing in a less desolate part of the delta, finally made his way with his whaleboat's crew to a Russian settlement. Ninderman and Noros, advancing ahead of De Long's party in search of help, got through after the most fearful sacrifices. But it was too late to help.

The Navy always comes home with its shield or on it—and so De Long and his followers, dead from cold and starvation on the field of honor, alone on the Siberian wastes, were found by their own shipmates led by the mighty Melville.

The search for De Long and his cutter's crew was begun by Melville, himself badly battered and worn, when he learned that his captain had landed and that he might still be alive, but lost and weak and not able to forge on. This search had to be abandoned on account of the terrible cold and lack of food supplies available to the rescuers and also from Melville's own weakened condition.

A second search was organized, without delay, and Melville, accompanied by Ninderman, of surpassing devotion, and Bartlett, one of his own boat's crew, proceeded north and, picking up De Long's trail, traversed the banks of the Lena until on March 24—five months after De Long had breathed his last—he came upon four poles lashed together and sticking two feet above the deep snow. The muzzle of a Remington rifle stood near. Further south, at a distance of five hundred yards, Melville's devotion and loyalty were rewarded by the sight of De Long's frozen arm projecting above a snow drift. By his side lay Doctor Ambler. The Chinese Ah Sam was at his captain's feet. De Long's journal and pencil were found close at hand as he laid them down at the end. His companions were found buried in the snow under the poles.

There, in true sailorman fashion, Melville, with Ninderman and Bartlett, interred their dead. On the burial spot selected—the top of a solid rock three hundred feet high—they erected a tomb or cairn. First, they hewed out a great cross of foot-square drift logs—twenty-two feet high with a cross piece twelve feet long. Around this cross they built a box covered with heavy planks. Above the box was erected a roof. The whole was covered with stone and over these a layer of earth, so that when completed it resembled a pyramidal mound surmounted by a cross. On the cross was engraved by Melville and his men, this inscription:

> In memory of twelve of the officers and men of the Arctic Steamer "Jeannette," who died of starvation in the Lena Delta, October, 1881.

A hard and cruel fate—against De Long from the first—toyed with him right up to the end.

Only a few miles away were natives who could and should have rescued him and his followers. These natives migrating south, had met with Ninderman and Noros, the only two of De Long's boat crew strong enough to keep on, and they had heard too of Melville's landing. These ignorant Yakutas, believing that Melville was the "Captain" whom Ninderman and Noros begged them to go back and rescue, persisted in going in a wrong direction from where De Long lay, hoping to the end that help would come to him. De Long made a perfect landfall on the Lena Delta on a locality known as Sagasta, that, according to his Peterman's geography, was inhabited all the year around.

There was a native settlement only thirty miles distant from the landfall, but not where De Long's map showed it. He also passed, all unknowingly, within only ten miles of a native hut, where twenty reindeer carcasses had been hung for winter food. Thus was the heroic De Long robbed of his last chance to get home alive.

After Melville and his companion survivors of the *Jeannette* returned to the United States an expedition was dispatched to Siberia to remove the remains of De Long and his crew from the cairn in the Lena Delta and bring them home. Captain De Long and five of his men who had no next of kin were buried in the De Long family lot in Woodlawn Cemetery in Brooklyn. Over their graves there was erected two years ago by Mrs. De Long a heroic sized statue of De Long. This statue shows him in Arctic raiment forcing his way south in the face of a bitter Polar gale.

Again—*The* Engineering Competition

By Lieutenant (J.G.) Thomas J. Casey, *U. S. Navy*

COMPETITION is the spice of life. In fact, it is the essence of life itself, because life is admittedly a survival of the fittest—which means nothing else but competition. Competition in any form has been showered with praise by some and covered with contumely by others. A great experiment is going on in Russia, where competition in everyday life is reduced to the minimum in the communistic order of things. Somewhat the same idea was tried out at Jamestown in the early days, when the municipal storehouse was made the repository for the fruits of the colony's community labor, from which the loafer could draw as large a share as the most industrious colonist. The colony suffered a decline under this system, and I believe the same result would accrue to naval engineering were the spirit of competition suddenly to be dampened. So at the start it is agreed that competition in engineering is a worthy principle.

On the other hand there is no denying that an Ethiopian odor has been emanating from engineering's wood pile for many years. There have been terrible subterranean rumblings which have echoed through the wardroom of more than one ship and have now and then appeared in print as the groans of those oppressed under the yoke of the present competition. From the early days when the pencil began to compete with the shovel as an engineering implement up to the present time, these groans have been multiplying. On one of the old ships, when engineering efficiency was unheard of, a new chief engineer arrived who believed that a good gasket was better than a bucket for keeping water off the floor plates. Unfortunately, his theoretical ideas claimed more of the public eye than his practical ones, and he gained a lot of local notoriety among the black gang on his mathematical propensities. Now on this ship, as on every old coal burner, the firemen's washroom was the promised land in which fresh water ran free and steam for heating it could be had for the turning of a valve. The new chief engineer proceeded to establish an allowance of fresh water which was ample enough, but this restriction was not particularly popular. Fresh water was at a premium over and above one's allowance. In addition, another valve was installed in the fireroom in the steam line to the washroom, so that the steam could be shut off in the fireroom at any time. One day a coal-heaver, who had just come off watch, drew his allowance of fresh water and, with a gleam of joyous anticipation in his eyes, slipped his bucket well under the steam nozzle, opened the valve and settled back to listen to the steam crackle and gurgle its way through the bucket. To his amazement and utter disgust the warming flow of steam not only failed to arrive, but, before his horrified eyes his prospective bath gradually faded away. It is alleged that he rushed to the engine-room hatch and bellowed, "You mathematical so and so, gimme back my water." Such black magic would, of course, have been in high disfavor. The explanation is that the valve on the steam line in the washroom was closed by the last man to use it and the valve in the fireroom was closed some time later. This left the length of pipe between the two valves full of steam which gradually condensed. When our hero turned on the steam valve—the valve in the fireroom being still closed—instead of a pressure of steam, he found a vacuum which gently wafted away his bath.

One could go on enumerating less comic and more tragic incidents than the above which have had ill effects on personnel, but the subject has already been well covered in the March, 1929, issue of the Proceedings by Lieutenant C. J. Harter (S. C.), U. S. Navy. Besides I wish to confine these remarks to an even-tenored consideration of what is wrong without citing any of the more unpleasant features which somehow tend to befog the issue.

First, in order to prove that murder has been done the *corpus delicti* must be produced. In other words, evidence must be shown that something really is wrong. Lieutenant Harter's article and others which I do not recall specifically would tend to show that all is not as it should be. Any officer who has gone to sea can recall personal experiences as a result of which either he or his adversary—depending on which side of the fence he occupied—roundly condemned the present scheme of things engineering. Perhaps the above may be classed as hearsay, so I shall produce some original testimony.

Every ship has its economical steaming speed. When the engineering competition first was inaugurated, ships naturally steamed at a speed in the general vicinity of the economical speed. When the reports of scores were analyzed it was noted that ships were steaming well under their allowances at or near economical speeds, and that these speeds were most frequently used. Result—allowances at these speeds were cut down, and down, and down, until it became suicidal from the standpoint of score to steam at the economical speeds. Slick engineer officers sat down and drew curves of allowances and expenditures versus speeds, and where the ordinate to the allowance curve most exceeded that to the expenditure curve the speed corresponding was noted and it became *The Speed*. What mattered it if the fuel expenditure at this speed exceeded that at the economical speed by a considerable amount, if the most infinitesimal gain in score was the result? On destroyers, very high or very low speeds became the order of the day. Very high speeds are popular with all hands—the engineer officer can turn in a decent score and those who like to "get there and back in a hurry" are satisfied. But what could be more soul destroying than to limp along at six knots on a ship capable of twenty-eight, merely to make a big score and at the expense of economy? I should say our first charge against the present engineering competition is that the interests of economy have been defeated by the very means which were planned to boost it.

Why do ships steaming steadily in formation show a discrepancy in miles steamed from day to day of anything up to twenty miles? All ships are standardized—the discrepancy is indeed a curious phenomenon. How can one ship burn several thousand gallons more oil than another ship engaged in the same exercises and enjoying the same allowances, and turn in a higher score than the latter? May this discrepancy be attributed to over-enthusiasm or to a phenomenon of nature? How can the allowances be cut 12 per cent for one year and the scores for a representative group advance from 3 to 5 per cent over the scores for the same group for the preceding year? This indicates an advance *for the group* of from 15 to 17 per cent—indeed a phenomenal record, and apparently accomplished with identical personnel and operating principles and with older material. Will this advance never stop? At the present rate of improvement, fuel allowances in the not distant future will be required for nothing but lead pencils. The second charge against the present engineering competition, therefore, is that the results obtained are inaccurate to say the least.

"The gunner works from sun to sun but the engineer's work is never done." So goes the old refrain and, braving the disfavor of the gunners, I dare say that there is at least a grain of truth in it. At any rate it is true that the present cumbersome Form Hypo is detrimental, in that it keeps an engineering officer fairly busy without his ever going near the engine room. On small ships, where the officer personnel of the engineering department consists of one solitary officer, this state of affairs becomes serious. Either time in the engine room or care in the paper work must be sacrificed, and either course is pregnant with pitfalls for the young engineer. The third charge against the present competition is that it tends to distract the attention of the engineer officer from his *raison d'etre*—the engine room.

The problem of distributing fuel equitably and charging it to the right ship has assumed Gargantuan proportions. From the time the tanker loads the oil from the contractor until that same oil goes up the stack it is guarded like gold bullion, and causes no less trouble. Reams of orders are written on the subject of fueling and checks and counter-checks employed to keep one naval officer and gentleman from appropriating some of the oil for which another is charged. In spite of all these counter-checks and in the face of the Act of Congress making every naval officer a gentleman, some, carried away by

youthful enthusiasm perhaps, manage to get more oil than their share. Result—investigations, with attendant loss of man hours, and suspicions which hold every man guilty until he proves himself innocent. Think of the extraordinary precautions taken when a few barrels of oil are involved. When a destroyer division is going to be fueled a lengthy order is published designating umpires, who are to see to it that justice is done. The personnel for such a board of umpires includes the commissioner of police—one commanding officer, the chief of police—one executive officer, six patrolmen—the engineer officer from each ship, and one judge—the fueling or supply officer of the tanker, whose word is law. After all, we are all in the same Navy, so what difference should it make if the *Tuscarora* burned some oil for which the *Pinafore* was charged? As long as the present competition goes on we shall have to have the lengthy orders, the petty squabbles, and the ponderous police system now associated with the transfer of fuel from one ship of the United States Navy to five or six others. Therefore, the fourth charge against the present competition is that it is detrimental to morals and morale.

Now the unique part of this paper, which thus far has, no doubt, appeared nihilistic, is the offer of a solution. As it happens the idea was original with me, but I claim no particular distinction as I have discovered, in talking with others interested in the subject, that they have thought of the same thing. I consider this the best commentary that a more or less revolutionary idea could receive—it is so obviously the remedy that it has occurred to the majority of those who are interested in the subject. Stated as simply as possible, the idea is to eliminate the Form Hypo entirely and substitute in its place from eight to twelve full-power runs a year. For each full-power run a board of observers would be appointed, similar to a gunnery observing board, the number depending on the type of ship and the special features involved. The duty of this board would be to sound the tanks of the ship under trial just before the run and ascertain the amount of oil aboard, to read the engine-room counters at the start of the trial, to ascertain the draft at start of trial, to observe smoke, fireroom pressures and temperatures, blower speeds and bearing temperatures, to read the oil meters and engine-room counters every hour, to take actual soundings at the end of the run, making allowances for oil burned from the time of finishing the run until sounding is taken on the oil tank under suction, and to collect any other data which might be of interest. The report would consist of a score worked out on the basis of oil burned during the run versus the oil allowed—the present allowances for the speeds in question could be used—with a correction factor for smoke, failure to make required speed, or poor operation. In any case a comment on the principles of operation would be included. At times other than during these trials competition would ostensibly be inoperative, in that no Form Hypo or other form of score keeping would be required. The above is a skeleton outline of the plan.

Now let us consider the objections to this idea. The first would be that the abolition of the Form Hypo, without substitution of some other form of daily competition, would cause laxness and a general let-down of efficiency. The above plan would be the substitution of another form of daily competition for the present Form Hypo, because the use made of the intervening time between trials would be the crux of the competition. Anyone with the slightest experience in engineering must realize that repair and overhaul schedules must be followed all the time to avoid being swamped. No ship which allowed things to slide in the periods between trials could catch up in one or two days and be able to make a creditable showing on the trial itself. There would seem to be no doubt that this plan would demand rigorous overhaul, constant supervision, and correct operation of the plant at all times.

The second objection might be that ships would waste oil by steaming at uneconomical speeds. This tendency could be corrected easily by action of the force commander in prescribing a range of economical speeds for specific purposes, an action which a force commander probably hesitates to take under present conditions, for fear of injuring a ship's score. Of course, a report of oil consumed per month and miles steamed would be required, and a check exercised in this manner. An amplified S & A 115 would suffice for this purpose.

Now let us consider some of the advantages. They are: (1) release of engineering personnel from paper work which interferes with their primary duties; (2) a com-

petition which really means something in that the best ship would undoubtedly win under this plan; (3) solution of the fueling problem; (4) better coöperation between gunnery and engineering with a consequent rise of morale; (5) better overhaul and more strict compliance with the Bureau of Engineering practice and safety precautions; (6) greater weight attached to operating data sheets; (7) more steaming at economical speeds with a consequent increase in fuel economy.

Most of the above advantages are obvious, but some of them will bear elucidating. That this method of competition would mean more than the present method is perhaps a sweeping statement, but there is no doubt that the winner of the present competition is acclaimed as a slick bookkeeper rather than a good engineer. At present the engineer who can always find a little more "velvet" in his tanks, steam more miles (on paper) than other ships steaming with him, and avoid penalties by fair means or foul, has the best chance of winning. With a board of impartial officers sounding the tanks and making out the score under the suggested plan, the best ship must win.

As for the fueling problem, since a ship's standing would depend on the oil consumed on her trials alone, there would be no dispute over invoices when ships fuel together. Consequently, the elaborate system mentioned heretofore would be unnecessary.

On most ships the engineering competition draws a sharp boundary line between the engineering and gunnery departments, and exactly where coöperation is most needed the serpent of discord is ever ready to raise its head. Extra power for operating turrets, searchlights, and torpedo air compressors appears to be the equivalent of the life blood of the engineering department, and is grudgingly meted out accordingly. Perfect harmony should prevail between these two important departments of an efficient ship, and there is every reason why it would under the proposed conditions.

The operating data sheets are bottomless wells of information for an engineer officer if he has the time to analyze them and see that they are correctly kept. At present, operating data sheets are not kept as they should be and are not used to their best advantage. Under the proposed conditions they could be emphasized and used as a source of information in determining just which parts of the plant need jacking up.

In conclusion, it is only fair to say that the present competition has served its purpose well. It has contributed to economy and has stimulated interest in engineering. It now seems, however, to have become the tail that wags the dog. It is cumbersome, top-heavy, and should be discarded. It is believed that the proposed skeleton plan, when worked out in detail by officers of experience and responsibility, will fill a much needed want in the Navy.

Safe Storage *of* High Explosives

By COMMANDER ALFRED H. MILES, *U. S. Navy**

THE havoc wrought by the explosion of TNT at the Naval Ammunition Depot, Lake Denmark, New Jersey, in July, 1926, caused those charged with the safety of naval munitions ashore to resurvey their situation and to provide against such catastrophes in the future.

This was the first great explosion to occur in a naval ammunition depot ashore. Magazine layouts had been designed many years ago when high explosives such as TNT (trinitrotoluol) were unknown. As the power of explosives increased, we continued to store, in bulk, immense quantities without knowledge as to the proper spacing to insure safety, and although these magazines once were isolated, now they have become surrounded by more or less populous communities. Under these conditions there could be only one result following an explosion in any single magazine, viz.: the ignition of others causing powerful detonations with their attendant disastrous circumstances.

The old idea of gunpowder storage had outlived its time—it took Lake Denmark to demonstrate that large bulks of TNT could not be cramped within small areas with impunity. The naval court of inquiry, recognizing this, recommended the establishment of East and West Coast depots for the storage of bulk TNT belonging to the Navy, these depots to be of large areas properly isolated. With this object in view, naval ordnance experts, aided by civil engineers, selected Hawthorne, Nevada, and Yorktown, Virginia, where the government already owned sufficient land to satisfy the demands of reasonable safety.

It can be stated as fundamental that any quantity of high explosives can be stored without danger to human life, provided there is sufficient unpopulated area available. It does not take an expert in explosives to recognize the truth of the statement that if the space be large enough and the unit quantities of explosives placed in that space small enough, there will be no danger of a ruinous explosion, provided of course that the units are separated at a distance in which sympathetic detonation is impossible.

What are these quantities and distances upon which we must rely in the layout of our ammunition depots for bulk storage? Fortunately statistics embracing explosions of quantities of explosives ranging from small amounts to approximately a million pounds, in manufacture, storage, and transportation, both in this country and abroad, covering a period of about fifty years, are available for our study.

In June 1909, Colonel B. W. Dunn, chief inspector of the Bureau of Explosives, representing the American Railway Association, brought forcibly to the attention of the manufacturers of explosives in the United States the necessity for some radical changes in the location of magazines. A conference resulted in the appointment of a special committee by the Association of Manufacturers of Powder and High Explosives. The work of the special committee resulted in the establishment, in December, 1910, of the American Table of Distances for inhabited buildings and public railways.

Experience having demonstrated the necessity for the establishment of distances to be maintained between buildings containing explosives and public highways, a further study was undertaken and a table of distances for highways compiled. In the year 1914, these highway distances were approved and adopted by the Institute of Makers of Explosives, in conjunction with the former special committee of the Association of Manufacturers, as an addition to the previously established distances for inhabited dwellings and public railways. The Institute of Makers of Explosives approved the complete American Table of Distances

*Formerly inspector of ordnance in charge, Navy Mine Depot, Yorktown, Virginia.

for inhabited buildings, public railways, and public highways.

Early in the year 1919 the American Table of Distances was taken under consideration by the Institute of Makers of Explosives for purposes of any revision developed by more recent experiences, and it was concluded that the only change to be made was the displaying of the Table of Distances in a more extended form for convenience of reference.

It need hardly be said that before a serious study could be made, it was necessary to collect from various sources the world's supply of data relating to the effects of explosions that had occurred. In the years devoted to the study every possible source of information was carefully searched, resulting in the accumulation and consideration of a large volume of data covering explosions and their effects. From this it proved possible to secure the necessary accurate information with which to measure the area of substantial structural damage. In this study, minor damage such as the breaking of a window glass or shaking down of plaster and possible damage from flying missiles was not considered. Structural damage was defined as that not readily reparable and it was assumed that unless some integral portion of a building was damaged, the occupants would not be subjected to serious risks.

The distances to be maintained in the case of railroads were deduced to be 60 per cent of that required for buildings because of the lesser height and smaller area of cars exposed to concussion, and their greater strength to withstand damage; furthermore, a building presents a constant risk while the presence of the train is only temporary.

The facts relating to each separate explosion were considered from the standpoint of the explosives involved, conditions under which stored, the distance at which the damage occurred, and its nature. With these factors determined, a chart was plotted, and the resulting curve embracing the extreme areas of damage represents the distances at present prescribed for inhabited barricaded buildings. (See graphs).

The largest known explosion at the time of these considerations was that of 875,000 pounds of black powder in storage at Fontanet, Indiana (not barricaded), which caused structural damage only within a 4,000-foot radius. The next largest was that of 600,000 pounds of dynamite in water transportation at Baltimore, Maryland. In this case there was no structural damage beyond 3,200 feet.

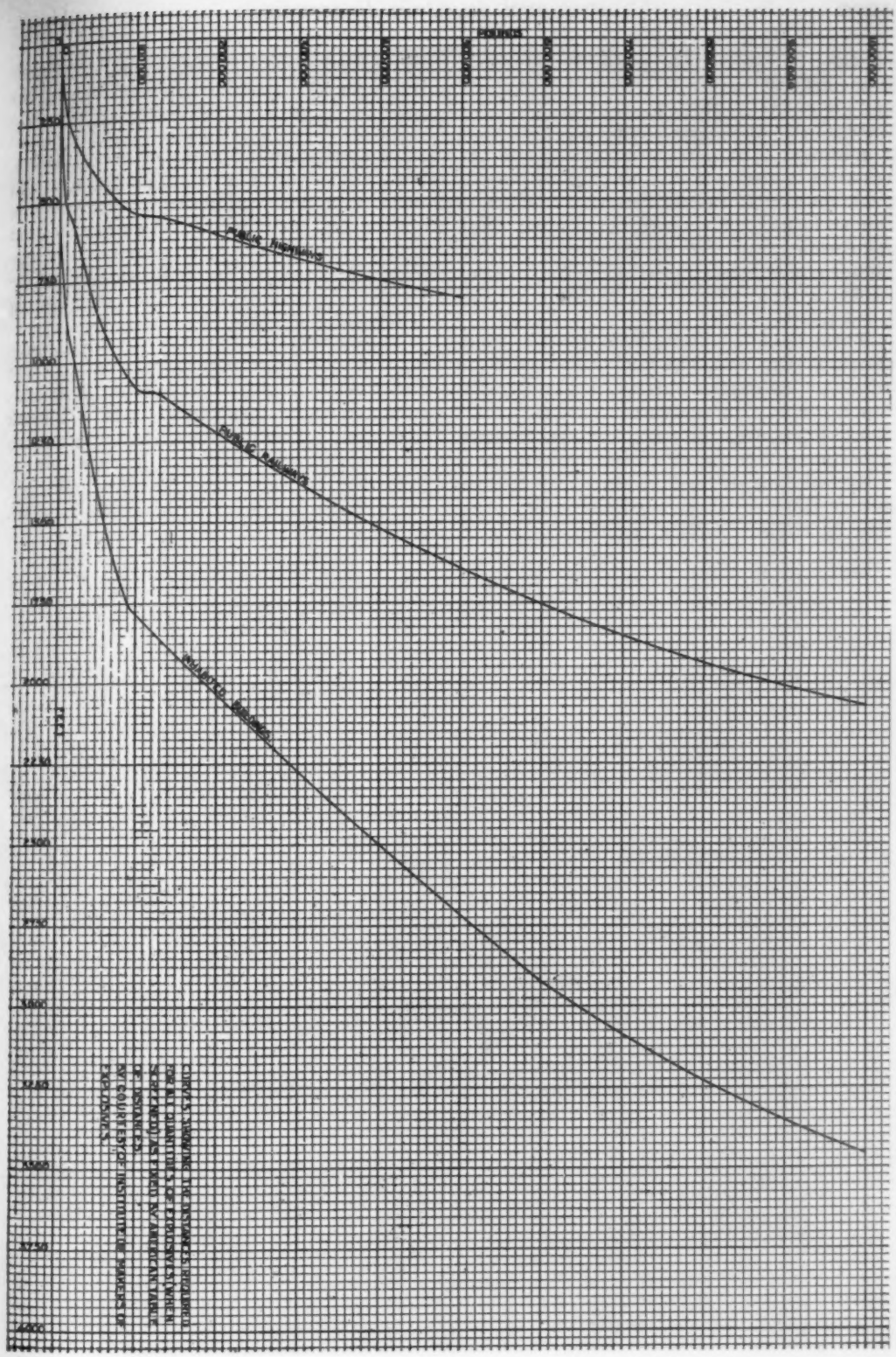
A study was also made to determine the distances at which magazines should be located from highways to reduce to a reasonable limit the danger to persons traveling along the highway should an explosion occur. A large volume of data was collected and studied, involving over one hundred explosions and the experience of about three hundred and fifty persons, and the conclusion was reached that the distances necessary to be maintained between magazines and buildings were adequate between magazines and highways in order properly to protect persons traveling on the highway.

The largest explosion considered in connection with highways was that of 398,415 pounds of dynamite and black powder, barricaded, which occurred within 1,000 feet of two men in a buggy who escaped unscathed. Another case involved the explosion of 32,275 pounds of guncotton in a barricaded building. Two men within 200 feet of the explosion were knocked down but uninjured.

Although spacing is the most essential element of safety, there are other important factors which the Navy has carefully considered in contemporary designs of magazines, such as barricades, geologic conditions, fireproofing, lightning protection, and prevention of missiles.

The dangerous concussion waves caused by a detonation travel radially overland, and it is to dissipate the sidewise vibrations and to direct them upward that barricades are a necessary adjunct in the design. Also, it is important that magazines be not built directly upon rock strata, for an explosion might transmit its mechanical energy to the layer in such a manner as to cause an earthquake of considerable dimensions. The underlying soil, preferably therefore, should be of alluvial origin.

These safety features are incorporated in the latest type of magazine designed and adopted by the Navy. This is an earth-covered, concrete, arched vault with a capacity of 143,000 pounds of TNT. The earth covering, which insures against fire from the outside, is one foot deep over the crown of the building and tapers off to a minimum of thirteen feet from the sides and back to form



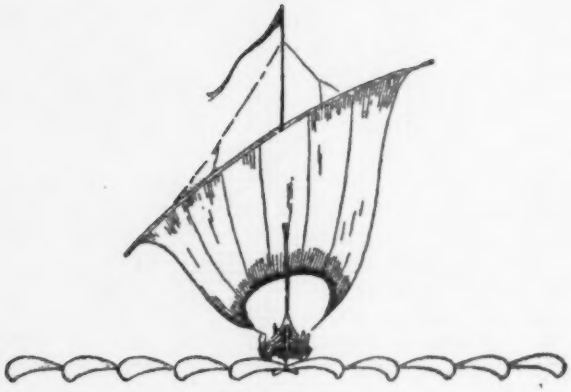
CURVES SHOWING THE DISTANCES PROJECTILES FROM ALL QUANTITIES OF EXPLOSIVES WHEN SCREENED AS LAID BY AMERICAN TARGE OF STANDARD PATTERN

BY COURTESY OF INSTITUTE OF ENGINEERS OF EXPLOSIVES

effective barricades. Opposite the entrance is an earth and timber barricade ten feet high and eighteen feet thick at its base. The segmental arch shape gives ample strength with a minimum amount of material, and the concrete is reënforced in the lightest practicable manner so that in the event of detonation no large fragments will be thrown. The reënforcing is of wire mesh securely tied together and grounded at six points by copper cable to form a complete electrical shield. (See photographs.)

These buildings are to be situated in small clearings surrounded by thickly wooded areas which act as muffler barricades. In the distances separating magazines from boundaries, highways, railways, and habitations, generous safety factors have been allowed. Elevated lookout posts, from which the observer has a clear view of the entire area, will be manned during the dry periods of spring and fall to guard against the brush or forest fires prevalent at these times. No one will be allowed to enter the explosive areas with the exception of the officer making the regulation inspection of magazines, and members of the mounted patrol who will keep continuous vigil during daylight hours. An efficient fire alarm and communication system is planned and each depot will be supplied with the latest modern fire-fighting apparatus and equipment for the extinguishing of brush fires.

The East Coast Depot is due for completion in 1929, and work on the West Coast Depot has recently been started. It is consoling to know that when the Navy's stock of high explosives is housed in these modern structures, there can be no chance of an explosion even remotely approaching in violence that which caused the Lake Denmark catastrophe.



Courtesy Commander A. H. Miles, U. S. Navy

ADDITIONAL STORAGE AND INCIDENTAL IMPROVEMENTS MAGAZINE, 4-E
Outside forms only removed. (N.M.D. Yorktown, Virginia, April 2, 1928).

Courtesy Commander A. H. Miles, U. S. Navy

MAGAZINE 5-B, SHOWING INTERIOR

The rough appearance of this concrete is due to color left by paint on the steel forms. The concrete is in reality very smooth. (N.M.D. Yorktown, Virginia, May 1, 1928).

Courtesy Commander A. H. Miles, U. S. Navy

MAGAZINE 5-B, SHOWING INTERIOR

The rough appearance of this concrete is due to color left by paint on the steel forms. The concrete is in reality very smooth. (N.M.D. Yorktown, Virginia, May 1, 1928).

Courtesy Commander A. H. Miles, U. S. Navy

MAGAZINE 4-G, SHOWING FILL 10 PER CENT HIGHER TO ALLOW FOR SHRINKAGE
(N.M.D. Yorktown, Virginia, June 1, 1928)

Courtesy Lieutenant E. B. Perry, U. S. Navy

TSINGTAO

Courtesy Lieutenant E. B. Perry, U. S. Navy

JAPANESE LANDING PARTY PASSING ALONG THE BUND, PACIFIC ROAD
Administration building in the background.

Courtesy Lieutenant E. B. Perry, U. S. Navy

DOCK SCENE AT TSINGTAO, LITTLE OR JUNK HARBOR

Courtesy Lieutenant E. B. Perry, U. S. Navy

VICTORIA BEACH, TSINGTAO
Strand Hotel in the left background.

Courtesy Lieutenant E. B. Perry, U. S. Navy

JAPANESE HOSPITAL, TSINGTAO

Courtesy Lieutenant E. B. Perry, U. S. Navy

SHANTUNG
Scene on the road to Laoshan

Courtesy Lieutenant E. B. Perry, U. S. Navy

SHANTUNG: HSIAN KU PAGODA

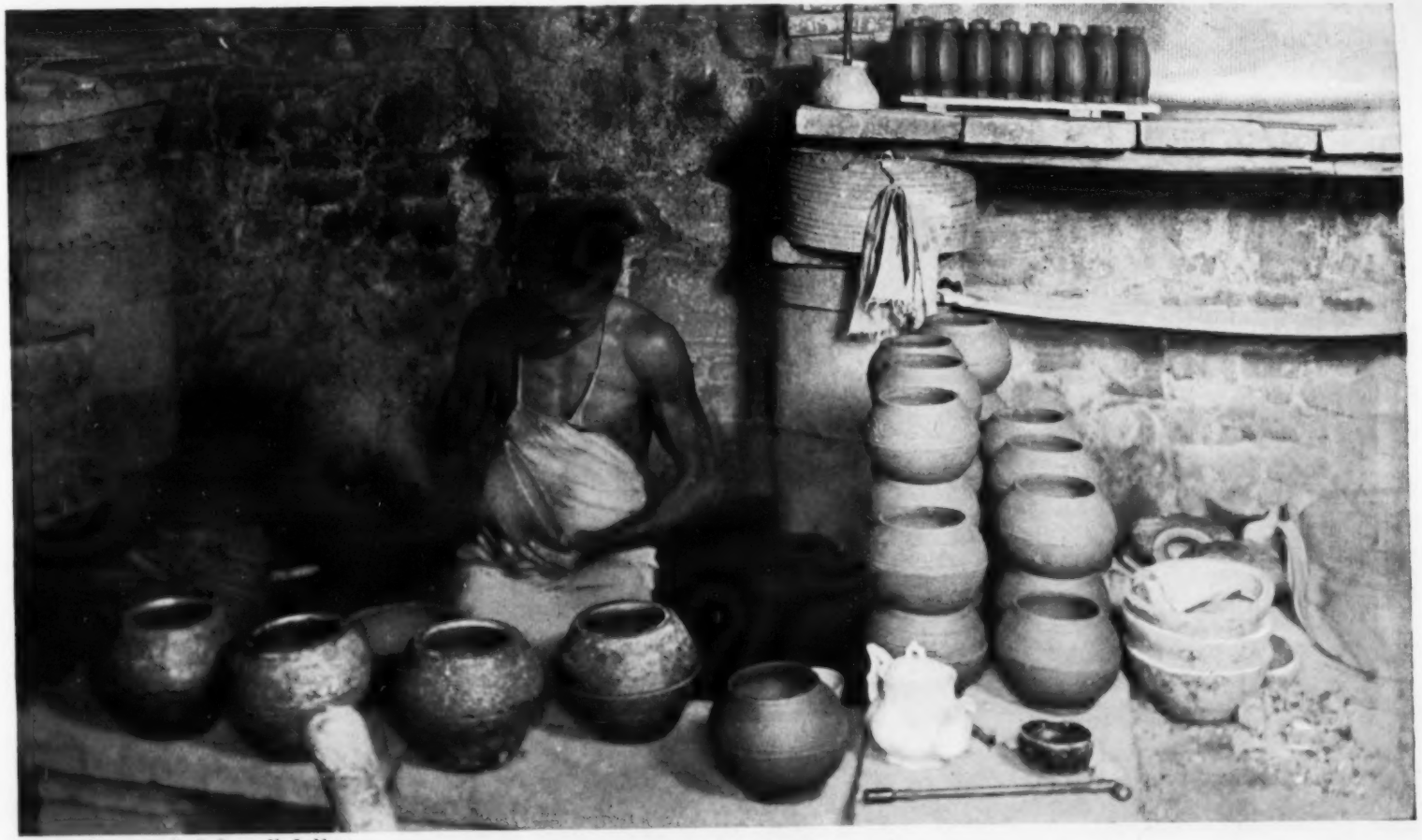
Courtesy Lieutenant E. B. Perry, U. S. Navy

SHANTUNG: SCENE IN THE TRUCK-RAISING DISTRICT

Courtesy Lieutenant E. B. Perry, U. S. Navy

SHANTUNG: COMMUNITY LAUNDRY

SHANTUNG: COMMUNITY LAUNDRY



Courtesy Lieutenant E. B. Perry, U. S. Navy

SHANTUNG: ROADSIDE POTTERY SHOP

Courtesy Lieutenant E. B. Perry, U. S. Navy

A PRIVATE TEA GARDEN

A PRIVATE TEA GARDEN

Courtesy Lieutenant E. B. Perry, U. S. Navy

TSINGTAO: THE GOVERNOR GENERAL'S RESIDENCE

Courtesy Lieutenant E. B. Perry, U. S. Navy

TSINGTAO: MEMORIAL TO THE THOUSANDS OF JAPANESE WHO FELL IN THE SIEGE OF TSINGTAO

Notes *from the* Submarine Divisions Asiatic

By LIEUTENANT EMIL B. PERRY, *U. S. Navy*

THERE is nothing quite so boring as to listen to a group of officers who have had duty on the Asiatic recounting their experiences, singing their songs, and swapping lies—unless it be to hear someone telling of a cruise in Constantinople. I know —I have done both. I now look forward to getting home so that I, too, may pose as an authority on China and things Chinese.

The Submarine Divisions, Asiatic, have never been a favorite with the student officers of the Submarine School. Generally the tail-enders get the preference of going to the Asiatic. There must be a reason and perhaps it is lack of information.

The Bureau of Navigation distributes a little circular concerning the station, telling in general terms what one may expect there, the duty in general, living costs, what one should take with him, and the percentage of people who like the duty. It was written from the point of view of general service on the Asiatic, certainly not from that of the submarines. Perhaps a little information having to do with the Asiatic submarines, their routine, cruises, duties, and stations, will tend to decrease the odds against such duty and make it appear more attractive. At any rate it will give the prospective Asiatic submarine sailor some idea of what to expect.

Of course, every submarine sailor knows that the Sixteenth and Seventeenth Divisions, with the *Beaver* and *Canopus* as tenders, plus the *Pigeon* as salvage vessel, comprise the Submarine Divisions, Asiatic. The boats are the *S-30* to *S-41* inclusive; all good boats. The *Beaver* tends the Sixteenth, and does a good job of it. She is comfortable and fast, a better tender than most. The Seventeenth is cared for by the *Canopus,* a large, roomy vessel with more staterooms than a liner. She appears to be all topsides but is well equipped, comfortable, and pretty much of a home. So much for the ships.

The Asiatic submarine year may well be divided into three parts: the torpedo year in China, the gunnery year in and about Manila, and overhaul at Cavite and Olongapo. The summer months from May to October are spent in going to, visiting, and returning from, China. From October to May is spent in and around Manila, with a yard overhaul period included.

When the newcomer arrives at Manila, either by transport via Honolulu and Guam, or commercially via Japan and China, he is apt to be disappointed. Manila is hot, not particularly clean, and the livable part all clustered within a small area. The Manila Hotel, The Army and Navy Club, the Elks Club, and the section around the Dewey Boulevard are the bright spots.

Married officers will learn that apartments are hard to obtain, mediocre when found, and living expensive. Servants are a necessary evil. They are independent and, generally, inefficient. In five months I hired and fired twelve cooks and my case was not unusual. There are numerous places to board, including the Manila, Leonard Wood, and Luneta Hotels and the Army and Navy Club Annex. Insofar as expense and comfort go, the married officer with children will probably do better by taking an apartment, either unfurnished and furnishing it with his own household effects, or one of the so-called furnished apartments. The childless couples will probably find it better to trust to the hotels and boarding houses. At any rate, with or without children, Manila will be found as expensive as the States.

For recreation there is golf and tennis, swimming in the pools of either the Polo Club or the Army and Navy Club, and dancing. Golf is cheap and the courses fair. Tennis is excellent if one can stand the heat and glare. The swimming, even though in

a pool of filtered sea water, is no better than fair. There is dancing every night at the Manila Hotel, the Club, and the Polo Club.

As a rule, single officers like Manila. They save money, play around with Army and Navy juniors, and enjoy the Club.

That is Manila and that is *all* of Manila.

The Army has a rest camp about two hundred miles out of Manila up in the mountains called Baguio. It is an ideal spot, cool and delightful. The Army kindly allows limited numbers of Navy personnel to go up there for short stays to get out of the heat. It offers cool weather and golf and should be visited by everyone who comes to the station.

The conditions for operating in and around Manila are excellent, except, again, for the heat. The diving areas are near the anchorage. The gunnery area is just outside the bay, off Marivelles. From an operating viewpoint, Manila rates high.

Of course the trip north to Tsingtao and the summer months there are the bright spots of the whole cruise. The wives go up commercially via Hongkong and Shanghai, at a cost of about one hundred dollars (gold) or, if fortunate, by transport. The Submarine Divisions sometimes stop at Hongkong, Amoy, and Shanghai on the trip up, which makes a very delightful, instructive, and interesting cruise of about two thousand miles, leaving the heat behind and getting into cooler water and weather.

Tsingtao! During the opening days of the World War we read that the Japanese were laying seige to the German concession of Tsingtao in North China. If we had time, in those hectic days, we dusted off the old atlas, turned to a map of China, and tried to locate Tsingtao. We knew about where to locate Hongkong, Canton, Shanghai, and Pekin, but this place Tsingtao was rather elusive.

Not finding it in a cursory glance, perhaps we were interested enough to go over that vast country carefully, inch by inch on the map, in a careful search. We knew that it must be on the seaboard since the seige started out as a naval engagement. At last, if we were really patient, we discovered Tsing-Tau, or perhaps Tsingtao, on the northeast coast of Kiaochow Bay, on the southern side of the Shantung peninsula.

Perhaps, at that time, we wondered what in the world the Germans were doing away up there. More lately we may have wondered why the Japanese have been continually landing there and staying there even at an admittedly tremendous expenditure of good Japanese yen. What sort of place is this Tsingtao and why should it be so eagerly sought?

There is a reason! The Shantung peninsula is the garden spot of China. Situated in the same latitude as San Francisco and Norfolk, Tsingtao enjoys all of the climatic changes of both. The winters are cool but not cold; snow is almost unknown; the springs and autumns are delightful; but it is the summer months of July, August, and September that give Tsingtao its fame.

When, in 1897, the Germans took possession of the city, in consequence of the murder of two German missionaries, they laid plans for the ninety-nine years their lease was to extend. They designated their concession by the name of Kiaochou and the city proper Tsingtau, naming the city from a small island in the outer harbor. The Chinese were induced to migrate to Taihsichen and Taitungshan, small villages near by, and then construction of a German city on Chinese soil was started.

Wide, well paved, level roads were built, a waterworks and a sewerage system were installed, forestation was started, and a modern city, typically German, had its beginning. Tsingtao became clean, orderly, and healthful, a truly lovely spot.

When that great conflagration of the World War broke out in 1914, Japan demanded the surrender of Tsingtao. After a point-blank refusal by Captain Meyer-Waldeck, of the German Navy, governor of Tsingtao, the Japanese, aided by the British, laid siege to the city.

The concession had been well fortified by the Germans, with a concrete and turreted fort on Huichuen Point, and a land battery on Bismarck Hill, and it was only after two and a half months of severe fighting, with appalling losses to the Japanese, that Tsingtao fell; and then only after the Japanese had crossed Chinese territory to attack it from the land side. Their ammunition expended, a handful of Germans surrendered to a Japanese army.

The Japanese formally took possession in November, 1914, and held the city until December, 1922, when, in accordance with the

famous "Wilson Points," the territory was ceded back to China. Meanwhile, and before the actual transfer, Japanese moved in by the thousands and Japanese interests bought all of the business property in the city, so that Tsingtao took on the unique character of a typically German city architecturally, controlled by the Japanese financially, and administered by the Chinese apparently. At times the administration has tottered towards the Japanese.

Tsingtao became one of the most prized of the Northern cities. Chang Tsung Chang, that tall, ungainly Mongolian, the right-hand man of the late Chang Tso Lin, laid his heavy hand upon it and was proclaimed the "Tupan of Shantung." He levied taxes, collected a harem of wives, about thirty in all, mostly Russians varying in age from sixteen to sixty, and made merry. When Chang Tsung Chang was in town, things happened. Those who attended his parties, and there were many parties, were allowed the privilege of dancing with his Chinese wives. The Russian wives, however, were never present. His victorious generals are said to have been allowed the pick of his harem. Chang Tsung Chang "tupanned" Shantung in merry style.

When the Nationalists, or Southerners, drove the Northerners back into Manchuria, the Japanese landed in Tsingtao and forbade any military operations by either faction within the confines of the city, much to the benefit of Tsingtao. As a consequence, the Nationalists took all of the territory around about but left Tsingtao an island in a war-torn land, still flying the Northern flag but unable to have communication with the Northerners. Tsingtao became a city with no national connection unless it were Japan. At the present time the Japanese are handing Tsingtao over to the Central Government.

Today the population of Tsingtao is divided into five groups. There are the Chinese, the Japanese, the White Russians, the Europeans and resident Americans, and the summer visitors, including the families of the naval personnel. The last-named group are by no means a small part of the foreign (non-Oriental) population, for Tsingtao is *the* summer resort of all of North China.

From the time one lands at the commercial harbor, either from a palatial ocean liner or from one of the little Chinese or Japanese coastwise traders held together by their rust, one realizes that at last a new sort of Chinese city has been discovered. A short ride in a brand new, high-powered, horn-honking American car, or in a more leisurely and far more economical ricksha, lands one in the very center of the foreign settlement. An hour's drive takes one to Victoria Beach around the old fortifications, now abandoned to the elements; past the former residence of the German governor, now occupied by the Chinese director-general, Chao Chi, a very dignified and capable politician; up the hill, and by the modern Japanese hospital. A short stop should be made at the Japanese Shrine and then the trip concludes with a shopping tour of the business district, 75 per cent Japanese.

A more extensive trip may be made to Laoshan, the mountaln district to the north: rocky, picturesque, and entirely deforested.

On the way we pass the Hsian Ku pagoda said to have been erected to the memory of a little Chinese girl who died at the age of fifteen but who had aleady at that tender age become famous as a doctor and herbist and had surpassed the scholars of her day in her knowledge of the intricacies of reading and writing.

Laoshan proves to be a high pinnacle of rock which commands an excellent view of the plains beyond. Refreshments are served at Munchen Valley, by Mein Herr Munchen himself, and then the return trip is made through truck gardens and level plains past the public laundries, quite unlike the American conception of a Chinese laundry, by the potter's shop, past the huge plant of the British-American Tobacco Company, for Shantung is a tobacco-raising district, back to town, and to the Grand Hotel for tiffin.

In the afternoon there may be racing; little Chinese ponies scooting around the track like rabbits, ridden by Chang, Needa, Tam, and other gentlemen jockeys. Graduates of various universities in the States, they sweat with their ponies in the effort to be the first at the finish.

For those who prefer to engage actively in sports, rather than to watch them, there is tennis, golf, swimming, and riding. Refreshments are served on the beach, cold German beer, soda pop, or whatever you may wish.

Fresh fruit there is in abundance. Strawberries as choice as those of New England;

peaches that rival the pride of Delaware; apples, pears, plums—all are to be had, fresh, in Tsingtao.

Such is Tsingtao, the gateway to the north, the Riviera of North China, and the summer base of the Asiatic Submarine Divisions. Here one lives at the Grand Hotel, the Castle Inn, Madame Paulin's or any one of several other boarding places. Very good accommodations may be had, including board, for one hundred dollars (gold) a month and up, according to how large a place is desired.

Tsingtao is ideal as a submarine operating base, there being plenty of good diving area close to the anchorage, the summer weather generally favorable, and plenty of supplies of all kinds available.

During the summer cruises are made to interesting ports nearby. Last year the Seventeenth Division made two such cruises: one to Dairen and one to Kobe. The trip to Kobe was made by the tender alone, taking such of the submarine officers as cared to go.

Now, there are several ways to see Japan. The most common is to call at Yokohama and Kobe, making flying leaps up to Tokyo, Kioto, and Nara. On this sort of trip you would meet all of the Number One ricksha men, the most pestiferous of the shopkeepers, and plenty of geisha girls. Of course you would head for the most European hotels to be found and you would find your childhood friends drinking Asahi beer in the lobbies. When you left Nippon you would take away a confused idea of a clever little people, slightly dark complexioned, either dressed very charmingly in native costume of kimono or haori coats, grotesquely in half European and half Oriental clothing, or monotonously in wholly Western clothes. Your dreams might be troubled by nightmares of crowded, narrow streets, cute little spider-webs of shops, Tansan water, Japanese saki, dwarfed trees, and hagglings over ricksha fares. At any rate you would assure all of the folks back home that the good old United States was "God's country" and that you couldn't see anything in Japan.

Pierre Loti also saw Japan, but that is another story which he tells very cleverly in his little book *Madame Chrysanthème.*

We, however, were fortunate in that we saw Japan under the kind auspices of the Japanese-American Society of Osaka, whose purpose was, and frankly is, to seek a better understanding with the American people—a gospel of Japanese propaganda. We were willing victims upon whom the Japanese-American Society worked—and how!

The American consul at Kobe, Mr. Dickover, brought us an invitation from the Osaka branch of the society to be their guests for a day. You know how anything of that sort is received. There is a general feeling that anything free has a "catch" in it. But finally fourteen of us, plus Mr. Dickover, accepted. We left the *Canopus* at nine o'clock the next morning, just a little suspicious that we were in for a dull day.

When we arrived at the dock, which, by the way, is known as the American Hatoba, we were met by a fleet of Blue taxies, nice little Chevrolet coaches, and conveyed to the Hanshin Electric Railway Station, the terminus of the Kobe-Osaka electric interurban railway. It was well out of the city proper and located on quite a high hill. Someone suggested that perhaps they had to have a high hill to take-off from, in order to get a good start, but we were soon to lose that impression.

We found ourselves provided with passes for the round trip to Osaka and the consul checked us in through the gates like a crowd of excited schoolboys. We mixed right in with the commuters: mothers with their babies strapped to their backs, flappers with bobbed hair and short skirts, business men with their brief cases, men in kimonos and wooden sandals and men who might have just stepped off Fifth Avenue. With our superior "subway" tactics we were all able to dive into a familiar type of side-seating car and grab seats to the exclusion of at least fifteen Japanese. The train filled up rapidly, almost Forty-second Street fashion, a bell rang, a whistle blew, and we were off. Differing from steam train practice, everyone kept on all of his clothes. You know, in the coaches of a Japanese steam train it is quite the thing to remove one's coat, trousers, shirt, and shoes and ride in comfort. It makes for quite a saving in laundry bills.

This custom of disrobing in the trains certainly does make for intimacy. Imagine walking into the Twentieth Century Limited and calmly removing your coat, collar and tie, shirt and trousers; folding them up carefully, and then taking your seat in an unconcerned manner. There is no privacy or

hurry to this disrobing act; all is deliberate and above board; nothing is concealed. Imagine trying to put over a good Pullman car story on a Japanese train!

Once our train started, there was no hesitation. The train jumped up to high speed and then gathered more speed. Soon we were just flying through the outskirts of Kobe, into little towns where we barely seemed to pause and then away again as though a huge magnet was sucking us into Osaka.

Only a few days before there had been a rather deplorable accident in this line. At one of the crossings a train had struck and killed a boy on a bicycle. Now, that in itself is not remarkable. Had the boy on the bicycle struck and injured the train, that would have been something to get excited about. However, the train stopped and the villagers clambered about the cars, seemingly intent upon lynching the motorman for the death he had so unwittingly caused. They became so intent upon chastising the unfortunate railroad man that they flocked all over both the east- and west-bound tracks, like hounds eager to be in on the death. Several west-bound trains, observing what was going on, slowed down and passed the scene of the accident without incident. Finally one train came zooming along and plowed into the excited mob, killing four more.

The Japanese is stubborn when he considers that he has a just cause and will sometimes risk death rather than give way. It perhaps is the old story of "losing face," which is never to be done. To us it was a lesson as to the stubbornness of the average Japanese when he considers that his rights have been in any way jeopardized. Perhaps we should remember this characteristic in our dealings with them.

After a run of a scant thirty minutes we found ourselves approaching a city of lofty, smoking stacks; a second Pittsburgh; Osaka, the largest city of Japan; a city with a population of over 2,220,000 people.

On previous trips to Kobe I had known that there was a city called Osaka across the bay. Right after the earthquake in 1927 I had visited Kobe and heard that several thousand people had lost their lives there. I had pictured it as a little city, spread out over a considerable territory, far inferior to and less modern than Kobe. I had no idea that the largest city in Japan was Osaka and that Kobe was only about one quarter its size.

The train slid into the station, the doors flew open, and we all piled out—and into the arms of the mayor's secretary and a whole flock of newspaper men. Cameras clicked, posed handshakes were exchanged, our impressions were asked and we all felt like movie queens returning from Europe married to dukes. We were rushed into a fleet of waiting cars, Buicks, Willys-Knights, and Packards, and in triumphant procession given the right-of-way by vigilant traffic police, on our way to the city hall to call on the mayor. Lacking only were the ticker-tapes and confetti to complete the illusion of a real New York-Broadway reception. Even some of the streets were torn up to make it realistic.

The mayor, very businesslike and quite Western in his ways, met us, shook us each by the hand, hoped that we would enjoy Osaka, and refreshed us with iced tea. We visited a few minutes and then posed on the city hall steps for the newspaper men, the mayor in our midst.

Knowing that we had a full day ahead of us, the mayor sped us on our way saying that he would see us at tiffin at the club and hoped that we would know Osaka better by that time.

Our second call was at the prefectural office, where we called upon the governor. He, too, was dressed in Western clothing, was rather reserved in manner, and appeared to be tremendously busy. Our call was short; the governor glanced at his wrist watch and then at his desk, wished us a pleasant and instructive visit, and said that he would see us at noon. We were not so sure that the governor had been so pleased to have us interrupt his work and left rather abashed. Anyhow, he did not speak English and it was rather difficult talking through an interpreter.

From there we made a round of the city, seeing the various points of interest, the temples, and the old castle.

Having had our fill of scenery, we were next driven to the Osaka Club, a select businessmen's club, for something more substantial. We found the governor and the mayor, together with about twenty representative Japanese business men, waiting as our hosts at tiffin. A very well-chosen and delicious luncheon, Western style, was served, and

then the mayor and the governor both made short speeches of welcome and good will, which were suitably returned.

We certainly were surprised when the governor read his speech—in English. Our call had evidently interrupted his preparation of this speech for we now found him, that effort over, an excellent host, genial and beaming. All of our other Japanese tiffin friends spoke excellent English and most of them with the slang of America. The greater part of the conversation was of baseball, over which the Japanese have gone mad. It was difficult to believe that we were not in some first-class club at home. The consul said that the Osaka Club was so expensive that few of the resident Americans could afford to belong; then we knew that we were not at home.

Toasts were sealed in Japanese beer and saki, that distinctive Japanese wine, and then we were conducted to the two largest newspaper plants in Japan, the plant of the Osaka *Asahi* and that of the Osaka *Mainichi*, each claiming a circulation of over a million copies daily. Both papers print English supplements and are active, energetic, and thoroughly alive to the newspaper game. In their Japanese edition they are handicapped in that all of the type must be set up by hand, for no linotype machine is conceivable which could handle the some three thousand characters necessary to the language.

I asked the managing editor of the *Mainichi* if he thought that Japan would ever come to the Roman alphabet in place of the Japanese. He was enthusiastic as to the advantages to be gained from a newspaper point of view but pointed out that the Japanese language is a spoken language with the written characters borrowed from the Chinese and that such a change would cause a great upheaval in the literature of Japan, would entail no end of expense, and could only come about through years of education.

Asked my impression of the plant in comparison with a newspaper press room in the United States, I said that the one outstanding difference was the number of men engaged in setting type, all by hand. That evidently was the wrong answer for my Japanese friend then explained in great detail that this paper had to be set up in a hurry, that time was limited, and that many men were of course necessary to get out such a big paper in such a short space of time. No up-and-coming Japanese will ever admit that they are even a little bit behind the times. Their pride is in their modern methods. The pet of the whole plant was a Hoe Ultra-Lightning press, the only one in the whole world, they said.

Perhaps it was the result of our huge appetites at the club, but at both newspaper plants we were treated to watermelon, ice cream, and various soft drinks. As we were leaving the *Mainichi* we were each presented with huge boxes of rice cakes, presents from the mayor, carefully and tastefully packed, to tide over our hunger until tea time. With the various pamphlets, magazines, folders and boxes we had collected en route, we all looked like Christmas shoppers gone astray.

Our guide, the mayor's secretary, now said that he had a real treat for us. When the society had first heard that we were coming it had decided to entertain us at tea in a typical Japanese home after the Western style. Fortunately, at the last minute, it had been decided that it would be more interesting and truly friendly for us to visit a real Japanese home and to be the guests of a Japanese who lived in Japanese style. Mr. Imai, a very wealthy man, had asked us to accept his hospitality at tea.

Once more we got into cars and went right into the very heart of the city, down a street given over to small shops, and stopped at a corner every bit as busy as Fourteenth Street at Broadway. We found ourselves entering a little curtained-off passageway into a small garden and being greeted by a squad of Japanese schoolboys all dressed up in sailor suits. Our host and hostess greeted us and bade us welcome to their home.

The entrance was not very prepossessing, but what a garden spot and doll house we found upon entering! The home comprised a small city block and was laid out complete with entrance court, reception room, tea rooms, living rooms, music room, and garden.

For the first time during the day we removed our shoes, and entered a small reception room where we knelt and paid our respects at the family shrine to the departed ancestors. A cleaner, trickier little shrine there never was. We then made our way to a small enclosed garden, where we were provided with the thonged type of Japanese straw sandal, not meant for Western stock-

ings, and conducted across the garden to a small ceremonial tea room, into which we entered on all fours.

In the olden days the door to the tea room was always made small so that it was necessary to enter by crawling. This necessitated the removal of one's sword before entering, which insured peace and harmony at tea. Nowadays we have only to provide gags.

The tea room contained all of the equipment for making tea as it should be made; a small charcoal hearth and kettle, tea bowls, ground green tea powder, a stirring brush of bamboo, a long-handled wooden dipper of minute capacity, and the jar for brewing the tea. After the process of a ceremonial tea had been explained to us, we went into a larger living room and then out along a platform overlooking a fairly large pond in the main garden. Here we fed bread rolls to hundreds of golden Japanese carp that seemed to be waiting expectantly. The fish well fed, we entered a large living room on the left and all squatted around in a circle; the Americans as near Turk fashion as nature would allow them, while the Japanese squatted on their heels. Here our party was supplemented by several very beautiful Japanese girls from the local girls' college, all thoroughly conversant with English, shy at first, extremely polite, and effeminate always. The party was divided so that there was a Japanese girl between each officer and then the tea ceremony commenced.

We were fortunate to have the master of the tea ceremonial with us and he, with his assistants, served the tea in accordance with the best Japanese traditions. I shall not attempt to describe the process; it is a study of a lifetime. Every move in the brewing of the tea, the whisking of the tea powder in the bowl of hot water, and of its serving, was a studied posture in gracefulness. The tea itself was a green, creamy fluid and was nothing at all like we are apt to expect tea to be. It was far richer and one drank tea leaves (which had been powdered) and all.

The tea ceremonial over, we were treated to a *danse d'Orient,* a slow walk with gestures, presented by a small Japanese boy to the music of a male soloist. In all truth, we were not much impressed with the dance but did enjoy it as a novelty of an ancient day.

Again we donned slippers, this time similar to the shinali of the Philippines, and walked out through the garden, around the fish pond, and over to a table set in the shrubbery. Since it was not the season for flowers, strips of colored paper and lanterns were hung about in substitution, for the Japanese must have their flowers, real or otherwise.

The table was loaded with food: rice, fish and what-not being pressed into tasty rolls. Chop sticks were provided and again we ate. Saki made its appearance in horn-shaped containers. Beer and sweet cider there was in abundance. Food began to be the last thing we desired.

As a further attraction we were taken to the end of the garden where earthen-ware vases, cups, bowls, and plates had been laid out for our signatures. They had been formed but not glazed or baked. We were each asked to take one and date and initial it. They would then be glazed, baked, and forwarded to us as a souvenir of our visit.

It is remarkable how, given half a chance, the least artistic of us will attempt to gild the lily. Instead of just dating and initialing the pottery, each and every one tried to outdo his neighbor in the artistry of his design. Were the artists who adorn satsuma ware to see that collection they would all die of envy.

We had now overstayed our allotted time by half an hour and, with sincere expressions of regret, we parted from our Japanese friends, the family of Mr. Imai. Our last call of the day was to be a tea-luncheon at the largest department store in Osaka, Mitsukoshi, Ltd., a seven-story building with a roof-garden dining room.

After the call at Mr. Imai's, this visit was distinctly anticlimax. We might just as well have been in Macy's in New York or Wanamaker's in Philadelphia. The store was absolutely modern, American, and not even interesting. We had come to expect nothing less, and there it was. It is, perhaps, the highest compliment that I am able to pay the store but it was rather disappointing after our truly Japanese tea of the afternoon. Don't think that the store was not a model of its kind; it was, but it brought us back to everyday life with too much of a thump.

Loaded down with tokens of good will, not having spent one sen or visited one temple, we regretfully left Osaka feeling that we had been delightfully entertained by charming people. We had met and played

with the Japanese as "folks." They had shown us the high spots of their city, the buildings and plants in which they took the most pride. That pride was not hidden under a mask; it was clearly evident, as evident as ours would have been in Columbus, Ohio, or Richmond, Virginia.

They took a natural and just pride in the old style of Japanese home, the same that we take in an old colonial house. They knew that it was entirely foreign and queer to us for they know the insides and outsides of the Western home. They had no objection to our thinking what we wished of that home. It belonged to them, nationally. True, they did appreciate a sympathetic attitude but they offered no excuses for any feature of it; it was theirs and they loved it.

Industrially, the story is quite different. Japan is chock-a-block full of the newest and most modern machinery for every purpose. They would not admit being behind the times industrially, even if they knew they were. Japan is going after world trade with every ounce that is in her. Japan believes that the Japanese are the equal of any people in the world and it will take a whole lot of showing to prove to her otherwise. She resents any suggestion of inferiority. They will fight for that belief and, like the people on the railroad track, will take death in preference to any national dishonor.

The people we had visited during the day would do honor to any community. Well bred, educated to the minute, they were thoroughly cosmopolitan. One liked them for themselves, not just because they were charming hosts. One left them with the feeling that it would be nice to see them again and to know them better.

The old is passing; automobiles are crowding rickshas off the streets, modern business methods prevail, the Japanese are becoming truly Western in their apparel, their speech, their ways, and even in their manner of thinking. A nation soaked in national consciousness is demanding a place in the world second to none and will insist upon getting it. Surely the East and West shall meet. The question is—how?

It may appear that we have wandered quite a way from submarines. Submarining in the Asiatic is not all torpedoes, gunnery, and engineering, however, and that I have tried to bring out by giving a few examples of other things that submarines do in the Orient. They are some of the reasons why submarining in the Orient has its charms.

On the whole the Submarine Divisions, Asiatic, is a pretty good place to be. There is work and plenty of it, not always under the best of conditions. There is plenty of sun, with its attendant "prickly heat." Mail arrives about every two weeks, and it is over a month old. Expenses are not much, if any, less than in the States—and slowly going up. Food is good, but not as good as in the States. It is a long way from home. It is about two years behind on the current movies and there are no first-class shows. It is becoming more and more Westernized and will soon cease to be truly Oriental. All in all, no submariner will do wrong to give it a whirl.

Review *of* International Communications *with* Special Reference *to the* Pacific Situation

By CAPTAIN MILTON S. DAVIS, *U. S. Navy*

THE years of 1927 and 1928 will pass into history as very important ones in the development of communications, not only for the United States, but also from the point of view of world interests. In the technical field of communications, there have been no outstanding inventions, but much has been accomplished in connection with the consolidation of advances made in the art in preceding years. There have been many minor improvements and refinements in equipment, making for cheaper and more efficient transmission and reception of message traffic; and this remark applies with special force in connection with the use of different forms of radio transmission. While the different technical features of the forms of communication are of great interest, it is in the field of activity of the engineer that there will be found an extensive literature; but, in connection with the political and economic features of communications, information is not so widely disseminated in the United States, and, as a result of this situation, its importance is often little appreciated by the country at large.

However, there are evidences of awakening interest in the subject, and the importance of American control in communications is being realized by an increasing number of professional and business men in the United States. It has been said, somewhat aptly, that transportation and communications are the handmaids of commerce. Transportation, especially overseas transportation, is beginning to be understood by the American people, and, during the last year, attempts at developing a proper policy for an American merchant marine have been in process of formation through the Jones-White Law recently enacted by Congress. In connection with communications, a different situation exists, as there is apparently no national policy or program. There seems to be no national thought on communications, and no American writers or American associations devoted to the education of the country in communications. Different companies, operating systems of communication, may have plans for future developments, but from a perusal of reports of debates in Congress, statements of the Radio Commission, and such articles as have appeared in magazines and periodicals, it would appear that there is little developed American thought, tending to coördinate such efforts toward a common national purpose in the field of communications. Some beginnings have been made, but compared with similar efforts abroad, American efforts appear somewhat meager.

Except for the cable to Alaska, it has been the American practice to leave the development of cables to private initiative, and, in connection with this statement, it may be said that American private enterprise has done very creditably in this field. But there are limits to what private enterprise can do unaided by the nation. Private enterprise will not and should not go where there are no profits in sight; and if one looks beneath the surface, another serious restricting factor appears, for, in order to make headway, American private enterprises have become tangled up in the meshes of contracts, stock ownership, and agreements with foreign corporations and, in some cases, with foreign governments, making it possible, to some extent, for foreign governments or their citizens to be in a position to exert considerable pressure on American communication companies.

As in the case of the cables, the radio has

been left to private enterprise, unaided by subsidy. In the case of the radio, the American government has developed, through the Navy, an extensive system of high- and medium-power radio stations. They were mainly taken over or erected during the World War period. With the development of private radio enterprises, the corporations have looked with suspicion at this system, fearing the Navy radio as a possible competitor. But, following the policy enunciated by Congress, it will be noted that the Navy has withdrawn from the commercial field, turning the business over to private companies as fast as such companies have been able adequately to serve the public and preserve national interests. These remarks apply to overseas communications that have been served by the Navy radio, and, at present writing, the Navy radio supplies commercial communication only to outlying possessions, where private enterprise does not exist.

Neither the government nor the American cable and radio companies seem as yet prepared to get together to work out a policy meeting American needs, as envisaged by all interests. The companies seem to look upon transoceanic communication as a private domain, with which the government should not meddle. Neither do American cable or radio companies seek subsidies. They apparently only ask to be let alone. The general attitude of the government may be said to be opposed to subsidies, or to governmental ownership, and after a study of different acts of Congress, it can be readily deduced that the present policy only extends to participation of the government at present, exercised through the Navy Department, in communication activities of a pioneering nature, and to withdrawal when such business is sufficiently lucrative to attract private capital. Without criticizing this policy, it is apparent that it can be successful only in developing local American communication activities between portions of the United States and its dependencies. In extending American efforts to alien lands, more substantial measures of participation may be necessary, as the difficulties appear to be so great that a private corporation may not, unaided, be able to surmount them.

In general, it may be said that foreign nations take a more realistic view of national interests, and, in studying the communication activities of foreign nations, it is at once apparent that national aspirations are perhaps more developed than in the United States. In other countries there is a welding of government and private interests toward a nationalistic development of communications, wherein private enterprise is compelled to submerge its independence and operate to a common purpose. Difficulties often arise with this policy, for even foreign communication companies at times resent governmental interference. Controlled by such national policies, foreign private companies have valuable governmental support, not only in the form of subsidies and monopolies, but also in a very real way, in a diplomatic form, in dealing with aliens. It will be found that the active force behind this alien governmental assistance is the power of a developed public opinion.

Upon similar premises, it is apparent that there is a need of a crystallized public opinion on the part of Americans and, coincident with the development of such national opinion, a proper policy suited to American needs will evolve itself. It is to be remembered that Americans are late arrivals in the field; others are deeply entrenched, and barrier walls, analogous to tariff walls, have been erected that are well-nigh insurmountable to American companies attempting to enter the international field of communications.

This is a very important year in communications. Plans are on foot which will crystallize into policies which will govern communications for many years to come, and this remark applies to foreign countries as well as to our own. Abroad, in Great Britain, some remarkable events have been occurring, and a review of them will, perhaps, not be out of place.

For several years, it has been growing apparent that radio communication would be a serious rival of the cable companies; but, during 1928, matters came to such a pass that an adjustment between the rival systems became necessary. The installation of the Marconi beam system by the General Post Office of Great Britain, especially the service to Australia, brought matters to such a crisis that the British government decided to hold an imperial conference on communications in London. This conference met during the winter and spring under the presi-

dency of Sir John Gilmour, Secretary of State for Scotland.

In order to gain some conception of the competition between radio and cable transmission, the situation of the Marconi beam radio system and the Pacific cable to Australia will be related. The British-Canada-Australia cable, operated by the Cable Board, has been a lucrative enterprise, and over two years ago, owing to its satisfactory financial condition, the Cable Board decided to double the cable. This work has been going on, and the spans between Vancouver Island and Fanning Island and between Fanning Island and Suva, have been completed. Prior to the completion of the second span, the General Post Office installed the London-Melbourne beam radio system. The latter was very successful from inception of operation, and immediately the returns from the Pacific cable were considerably reduced. The radio beam, it was found, could operate at a profit at rates which meant eventual financial ruin to the cable. It also produced a situation of one government agency in sharp competition with another. To some degree, similar situations existed in other parts of the empire.

The competition of the radio was felt at once by the private cable companies, earnings falling off slightly. As far as the private cable companies were concerned, their future prospects appeared to be very uncertain, although, up to the present time, the actual injury to their earning power through the competition of the radio has not been great. It is to be pointed out that these different cable companies while operating independent companies, nevertheless have always been closely associated through traffic and other agreements. In the accounts of the different British company meetings, it is apparent that these enterprises are not only interested in making dividends, in common with the usual run of commercial companies, but also the directors feel a patriotic interest in the well-being of the empire and its economic advancement.

In calling this conference, it is obvious that the imperial government appreciated that something more was in jeopardy than the earnings of a few cable companies. With cable communication, it may be safely stated that the British have long enjoyed a predominant place, but with the rapid development of radio, and especially short-wave transmission, communication enterprises can be initiated at a ridiculously low capital investment. A serious situation was presented and, for a nation that looks upon communications as second to shipping in the fostering of its world trade, it is not surprising that there were assembled representatives of the empire to study this question, and to formulate a solution through which the outstanding position attained through cables would be retained in the newer radio.

Before the report of the conference was promulgated to the public, in March, 1928, the Eastern Telegraph Company and its associated companies, with its world-wide cable net, formed a merger with the Marconi Company, and, among other things, stated in the announcement that the basis of the combination was premised on the consideration that the cables were enterprises of the past, and that all indications pointed to the future as belonging to the radio, because of its cheapness. The cable companies are deeply entrenched and hold many valuable privileges and monopolies with a net enmeshing the world. British cable holdings amount to approximately 170,583 miles, of which 18,093 are government- or dominion-owned. There is reason to believe that their holdings are much greater than the above figures indicate, through stock ownership in cables nominally listed as belonging to other companies. The radio will share in the privileges of these companies, and the cables will have a share in the development of radio. Best of all, the cable companies have large surpluses, being one of the best investments on the London Stock Exchange. It has been stated that the merger will have a capital of $265,000,000 and cash assets of $100,000,000, which will make it financially capable of purchasing outright imperial and dominion cables and other cable property necessary for a complete empire net.

The next move, following the merger, was the purchase of the West Indian Cable and Wireless System by the Eastern Telegraph Company, thereby adding 8,000 miles of cable from Canada to the West Indies; wireless stations in Bermuda and Jamaica; and some valuable connections with communication companies in the United States.

Before the adjournment of Parliament, the report of the imperial conference was submitted to the government. Apparently

the plan recommended by the imperial conference is the formation of a communication company, to which the merger will sell all their communication assets in exchange for shares. The capital at inception is not to exceed £30,000,000. The communication company is to acquire by purchase the Pacific Cable Board's cables, the West Indian Cable and Wireless System (already accomplished), Imperial Atlantic Cables and the leasing of the beam radio system from the General Post Office for a period of twenty-five years. The rental charges for the Marconi beam wireless system and the service of the Pacific Cable Board's debt will be guaranteed by the merger company. Certain directors of the communication company must have the approval of the government, and both merger and communication company will have identical boards of directors, to insure uniformity of policy. Additional safeguards laid down are predominant British control, and the right of the government to commandeer all communication facilities during war or national emergency. An advisory committee is set up to regulate rates and to preserve the public interest of the empire and the dominions.

The transfer of government-owned properties will require approval of the imperial government and the dominions. There is no doubt that the report of this conference is an epoch-making document and commences a new era in empire communication. It represents quite a task unifying so many divergent and conflicting interests and it is especially interesting to an American how the spirit of patriotism for the empire runs like a thread throughout the entire plan. It is superfluous to state that a stupendous organization is planned, and its effect upon the world will be far reaching.

One outstanding feature of the report of the imperial conference is the recommendation for a departure from the policy of governmental ownership. It has obtained to a considerable extent in the cable net of the empire since 1902; but with the radio the government-ownership policy persisted until 1923, when private enterprise was permitted to enter the field. Now a policy of private ownership and operation is submitted to the empire and the dominions. It is needless to say that there will be an active political opposition from many quarters when Parliament and the Dominions proceed with the enactment of necessary legislation to put the plan into execution.

The formation of such a gigantic trust in London was bound to set up repercussions in the United States. Within a few days of the above merger of British cable and Marconi interests, the combination of the International Telephone and Telegraph Company and the Mackay Companies was announced in New York. The plan contemplates formation of a new Commercial Postal Company under the chairmanship of Mr. Mackay, which would operate the present Mackay system of cables and land lines running from Europe to Asia through America. An International Cables Company will be formed to operate the Commercial Cable System. No public financing has been announced and the combination will be made by exchange of stock. Said to have a $300,000,000 capital, it is readily seen that the combination is a parallel with the British merger. Plans include the establishment of wireless communication to Honolulu and to Manila, paralleling present cables, and enlargement of cable service to South America and the West Indies. The public announcements in connection with this merger are meager, and whether it will eventually be an actual or nominal American company remains to be seen.

There are some other items of interest in communications which have occurred during the year. A spectacular advance of the Radio Corporation of America on the New York Stock Exchange has taken place, the price of the common stock advancing from $82 to $450 per share, approximately, although no dividends are paid on this class of stock. It is said that different companies, notably the International Telephone and Telegraph Company, or the Western Union Telegraph Company, would not be averse to the purchase of the communication business of the Radio Corporation of America, but such rumors are probably Stock Exchange gossip. The Western Union stock also has had large increases in price. This company has failed to make satisfactory arrangements with the Japanese government for laying a cable from the United States to Japan. Another interesting item is the allocation of certain high-frequency channels of communication to the Dollar Steamship Company, which company probably intends entering this field as an adjunct to the ship-

ping interests. The newspapers have also been allocated channels of high frequency and may enter actively in the communication business.

With the background of the foregoing description of the development in world communications, some observations will be made in the Pacific Ocean situation. The original method of communication across the Pacific was by the cable of the Pacific Commercial Cable Company. This cable is nominally part of the Mackay system, prior to its absorption by the International Telephone and Telegraph Company. The Mackay system owned the entire capital stock of the Commercial Cable Company and the telegraph companies of the Postal system. The last authentic statement in connection with the ownership of the Pacific Commercial Cable was made to a Senate committee in 1921, from which it appears that approximately one-fourth of the capital stock of the Pacific Commercial Cable Company is owned by each of the following: the Mackay Company, the Great Northern Telegraph Company, the Eastern Extension–Australasian Telegraph Company, and Eastern Telegraph Company; of these the first is an American company, the second a Danish company and the last two British. A short time prior to the Spanish War, the British Eastern Extension–Australasian Company acquired from Spain certain rights in the Philippines, and in view of the above statement in connection with the Pacific Commercial Company's cable, it would appear that these rights of this company, and Eastern Telegraph Company; of part of the world system now in the merger. Rates over the Pacific Commercial cables are high, making it often cheaper for customers located on the western shores of the Pacific to use either the Danish or the British cables. The Pacific Commercial Cable runs from San Francisco to Honolulu, Midway, Guam, Manila, and Shanghai. It connects at Manila and Shanghai with the Eastern Extension and with the Eastern for a south-about route to London, and with the Great Northern which operates land-line connections, north-about through Siberia, Russia, Scandinavia, to London.

The fact that the Pacific Commercial Cable runs to Shanghai indicates that it must be in accord with the interest of the Eastern Telegraph Company and its associates. These latter cable companies have exclusive rights in China until December 31, 1930. It is somewhat out of place in this paper to go into all the devious negotiations and agreements in Chinese communications, but for those who would peruse the subject, an excellent account can be found in Chapter 38, Volume 2, *Foreign Rights and Interests in China*, by Westel W. Willoughby. The cable routes are set forth in Hydrographic Office Charts of World Communications, Nos. 2180, 2180B, and 2180C, issued by the Navy Department.

The Radio Corporation of America maintains radio circuits to Honolulu, Japan, and Manila, with connections in the Dutch Indies and to Saigon. It has acquired the rights of the old Federal Telegraph Company of Delaware to erect a radio station in China, but has never been able to proceed, owing to the objection from the British, Danes, and Japanese. Lately, the matter has come up again, and it is hoped that the Americans will be able to enjoy the advantages of direct communication with China. Late advices indicate that this will be consummated. Without going into details, the United States has a very good claim based upon a treaty of long standing with China.

The Pacific cable, owned jointly by Great Britain, Canada, and Australia, and operated by the Cable Board, connects Vancouver Island with Australia and New Zealand, with relays at Fanning Island and Suva. In Australia, connection is made with the Eastern Extension to London. Much of the business of this cable originates in the United States.

Australia has beam radio connection with Canada and England. The Radio Corporation of America has recently established a circuit from Rock Point (Long Island) to Montreal, from whence there is beam radio transmission to Australia.

Recently the Mackay Company acquired the communication service of the Federal Telegraph Company of California, and is now proceeding with the establishment of a radio circuit to Manila. The annual statement of the Mackay Company describes the plan of using radio to support the cable, thereby insuring service during cable breaks. However, as this plan contravened Section 17 of the Radio Act, some corporate changes became necessary to divorce the

cable companies from the radio company. This action of the Mackay Company in acquiring radio service bears some analogy to recent events in London.

The Navy maintains a military radio circuit from Washington to Manila, relaying at San Francisco and Honolulu. Connection is made with Samoa, Guam, and Peking. This service is open to commercial business to Samoa only. Commercial press dispatches may be handled to Manila. In 1921, at the arms conference, the United States agreed not to permit the Peking station to transmit or receive commercial press dispatches. A very valuable privilege was given up by this action.

Compared to the Atlantic, there is a paucity of communication facilities in the Pacific, but as time passes increases will come, especially since short-wave transmission is cheap. However, the difficulties lie in other quarters, as American penetration stops with its own dependencies.

With the cable net, it will be readily understood that messages are signaled between cable stations over an insulated wire laid on the ocean floor, connecting the respective cable stations. In radio, transmission takes place through the air; consequently, any receiver properly tuned, placed within the circle of audibility of a transmitter, as a center, will receive the signals sent out by such a transmitter. Comparing this radio situation with that of the cables, it will be seen that the cable is secret except to the operator, while the radio message may be intercepted by anyone who may have a proper receiver tuned to the sending frequency of the transmitter and sufficient skill in reading the continental code of signals. To make radio more secret, several expedients have been evolved, namely, use of the beam which reduces the audible circle to a narrow sector, use of automatic sending at high speed, requiring special equipment for reception, and photographic sending, where a whole message is sent simultaneously.

Although audible to all listeners, radio message traffic is transmitted from point to point in a manner analogous to the operation of the cable, and, on this principle, the different companies have evolved communication routes. Even the cables have routings laid down for the expeditious handling of message traffic. Not only are these routes designed for company profit, but they usually support national aspirations, economically and politically.

A few years ago commercial houses transacted practically all of their business through the medium of the mails, the use of cable and telegraph for such messages being the exception, reserved for urgent orders. But times change, and one of the noticeable changes, especially in overseas business, is the increasing use of telephonic and cable orders. As there is a demand for fast freight, there is an analogous demand for swift communications.

This paper on "Communications" has been prepared from various articles appearing from time to time in American and foreign newspapers and periodicals. These different articles tell piecemeal of the gigantic movements in the communication world that occurred last year. When these accounts are placed side by side and written as a complete story, it becomes an amazing narrative. It takes no stretch of the imagination to see that there is need of American communication contacts, in peace time, in developing trade and proper friendly intercourse with foreign nations; and, in war, in strengthening the national defense and protecting the morale of the American people. As in several other international matters, Americans are newcomers in the communication activities of the world; but their value is beginning to be understood by the country at large, and one of the signs of the times is the increasing number of Americans who feel the need of a crystallized American policy for the development of American communications.

A Short History *of the* Leech Tennis Trophy

By LIEUTENANT COMMANDER VINCENT H. GODFREY, *U. S. Navy*

INASMUCH as the only annual athletic competition between Army and Navy, unrestricted and unqualified, is for the Leech Tennis Trophy, a short history of the cup itself and the matches for its possession should be of interest to the Navy and its friends.

In the fall of 1923, Mr. Dwight F. Davis, then Secretary of War, realized fully the hold that tennis has on the world at large. That year twenty-three nations challenged the United States, the then holder of the historic Davis Cup, and the cup thereby became the most widely sought of all international trophies. Naturally the donor of a cup which has had such wonderful success in promoting friendly international rivalry and good feeling would look with favor on any similar but non-interfering project.

This project was introduced by Mr. Abner Y. Leech of Washington, D.C., a staunch devotee of tennis and a life-long friend of the two services. He suggested to Mr. Davis that a similar contest to be held annually between picked teams from the Army and Navy would arouse great service interest and improve the quality of the tennis played throughout the Army and Navy. After consultation between Mr. Leech, Mr. Davis, and Mr. Wilbur, Secretary of the Navy, Mr. Leech's offer of a cup for annual competition was accepted, the terms under which the cup was to be held were drawn up, and the Leech Army and Navy Tennis Trophy Competition came into existence.

These terms are very simple: all officers and enlisted men on active duty are eligible (cadets and midshipmen are barred), the Marine Corps is to count as Navy; the contest or "tie" each year is to consist of four singles matches and three doubles matches; the whole tie is to be played off in one day, weather permitting; and all matches to be best two out of three sets. The team winning the majority of the individual matches is the winner of the tie and takes custody of the cup for the ensuing year. In order to disperse the interest in the matches throughout all grades, doubles was given the larger proportional value, to the end that even when advancing years prohibit the tax of strenuous singles, older officers may substitute craft and skill for agility in the doubles. The result has been in accordance with the desired end.

The first year of competition, 1924, Army, inspired by the fame of their chief, stole a march on Navy; the Army team, led by Colonel Waite C. Johnson, was assembled several days before the match, well trained, and carefully selected, whereas until the day previous no attempt had been made to procure a Navy team, and the last minute rallying of forces, although producing a nucleus for future years, resulted in a very weak combination, lacking in practice. The inevitable occurred: Army won all seven matches without the loss of a set. The high light of the tie was the play of Major R. C. Van Vliet of the Army, who, in starting his succession of wins in the number one singles match, gave proof of his superiority in form and became the actual interservice champion.

The following year, 1925, Navy was not to be caught napping. Captain W. S. Anderson, then on duty at the Naval Academy, was appointed captain, about twenty candidates were assembled at Annapolis, and a creditable team was sent up against Army at Chevy Chase on the twentieth of June. Army was still in the ascendancy, however, and in a close and exciting battle, decided only in the next to last doubles match, repelled the Navy assault by a score of four to three. Again Major Van Vliet dominated the field with victories in number one singles match, and with Colonel Johnson, in number one doubles, but Navy showed a potential

champion in Lieutenant R. M. Watt, Jr., who also won both his matches, singles and doubles, while Navy's third match was won by Captain Anderson after a terrific three-set struggle.

The scene of the conflict shifted for 1926. Philadelphia was the place, the Germantown Cricket Club kindly offering the use of its fine grass courts and making the tie one of the Sesquicentennial celebration attractions. Captain Anderson again led the Navy and this time to a victory by a five to two score. Major Van Vliet prevented an entire Army rout by winning his two matches, but his performance was matched by Lieutenant Watt and Ensign Lyman, both of whom figured in two winning matches for Navy.

In 1927 Army's lean year arrived. Captain Anderson, with the strongest team Navy has yet mustered, won an overwhelming victory, sweeping the boards and avenging the shutout suffered by Navy in the first year's play. Major Van Vliet did not play and Commander C. C. Gill succeeded him as individual champion, while both Lieutenant Watt and Ensign Lyman continued their stride by winning both singles and doubles.

With the score tied at two victories each, 1928 produced the most thrilling contest of all. Army, strengthened by Van Vliet's return, ran up against a Navy team weakened by the loss of Captain Anderson, Commander Gill, and Seaman Elliott. And what a battle ensued. Of the seven matches, six took the full three sets to decide and the seventh went to deuce in each set. At the end of the singles, each side had won two matches, and the finish of the first two doubles still left it a tie at three to three. The remaining and decisive doubles match was finally won by Navy after a nerve-wracking third set which ended at 10-8 in favor of Lieutenant Commander Godfrey, Navy captain, and Lieutenant Watt. Ensign Lyman and Ensign Howard bore the brunt of the fighting, accounting for three matches between them, while Army drew some slight consolation from Major Van Vliet's win of the number one singles match over Lieutenant Watt.

In 1929, the Navy team, strengthened by the return to active competition of Captain W. S. Anderson and Commander C. C. Gill, won an unexpectedly complete victory by a score of six matches to one over an Army team which was admitted to be the strongest they had yet placed in the field. The match was played, as usual, at Chevy Chase, Washington, D.C., on July 20, 1929.

The high light of the play was Navy's clean sweep in singles during which Lieutenant R. M. Watt, Jr., administered to Major Van Vliet the first defeat the latter had sustained in five years as Army's Number One man. Major Van Vliet had his revenge in doubles however where he and Major Finley won Army's only victory, defeating Lieutenant Watt and Lieutenant Commander Godfrey, captain of the Navy team, in a hard fought three-set match. Commander Gill won his singles and with Captain Anderson a doubles match, and the youngsters of the team, Ensigns Howard and Farrin, accounted for the other three matches.

Navy now leads in the annual competition, four ties to two, and in individual matches twenty-five to seventeen—not an overwhelming margin.

The National Lawn Tennis Association has recognized the improved quality of tennis brought out by these interservice matches, by inviting the winning number one doubles team each year to play in the National Doubles Tournament, where the requirements for eligibility to entry are so strict that only players of recognized merit are allowed. But owing to the exigencies of the services, neither Army nor Navy has as yet been able to send a team to the tournament.

The outstanding fact, however, is that this annual competition has raised the standard of tennis remarkably in both services. The candidates for the teams, even though unsuccessful in making the actual team, return to their various duties with improved form and tennis knowledge, and then proceed to disseminate this knowledge to their fellow officers and men. The result is that tennis, the most universal of all sports and hence the most useful and enjoyable to Army or Navy personnel, is improving by leaps and bounds and the Leech Tennis Trophy is accomplishing its real mission.

Courtesy Lieutenant Commander V. H. Godfrey, U. S. Navy

THE NAVY "LEECH CUP" TEAM OF 1926
At the Germantown Cricket Club, Philadelphia, Pennsylvania.

Courtesy Lieutenant Commander V. H. Godfrey, U. S. Navy

NAVY "LEECH CUP" TEAM OF 1928
At Chevy Chase, Washington, D.C.

At Chevy Chase, Washington, D.C.

Courtesy U. S. Naval Academy

MEMORIAL HALL AT THE UNITED STATES NAVAL ACADEMY

Showing the mural paintings as planned by the architect, Ernest Flagg. These plans were never carried out.

Courtesy Royal Naval College—Photo by H. Flower .

THE CHAPEL OF THE ROYAL NAVAL COLLEGE, DARTMOUTH, ENGLAND
The memorial tablets are located around the side aisles.

The memorial tablets are located around the side aisles.

Courtesy U. S. Military Academy

CULLUM MEMORIAL HALL (MAIN ROOM)
United States Military Academy, West Point.

Courtesy U. S. Military Academy

ENTRANCE TO CULLUM MEMORIAL HALL, UNITED STATES MILITARY ACADEMY
Showing the arrangements of tablets to distinguished officers.

Courtesy U. S. Military Academy

THE CADET CHAPEL, UNITED STATES MILITARY ACADEMY
Showing the arrangement of battle flags.

Showing the arrangements of tablets to distinguished officers.

Courtesy U. S. Naval Academy

"THE COMMISSION INVISIBLE"

The window in the Naval Academy Chapel presented by the class of 1927. It symbolizes the graduate's realization of his duty to God and Country.

Memorials *and* Naval Heroes

By HERMAN F. KRAFFT, *Curator, U. S. Naval Academy*

SHAKESPEARE'S swashbuckler Falstaff did not care for the rôle of hero, for he maintained you had to die to win. Sir Walter Blunt had just been "killed in action," or if you prefer, he had "died in the gallant performance of duty." As Falstaff stumbled over Sir Walter's body, he exclaimed: "There's honor for you! I'd rather be alive without honor, than dead with it!" Asking Shakespeare's pardon we may thus paraphrase Falstaff's ideas regarding death on the field of honor. To be a hero one must be dead, and, we might add, the longer one has been dead the greater the degree of glory. Sometimes, as we look at the monuments of bygone days, we wonder whether our discreet fat friend was not partly right, for he argued that slander and jealousy will not suffer a man to be a hero during his life. We are naturally less critical of the dead than of the living. In our hero worship distance in time often crowns with halos earlier warriors who were not always of heroic stature in their lives. Debunking biographers are daily trying to prove that even our Revolutionary leaders were frequently of frail human clay. Undoubtedly there are just as great heroes today, alive and in our midst, as ever walked the earth, but a century or so, quite rightly, apotheosizes the man. In hero worship as in love, distance makes the heart grow fonder.

Perhaps it would be better for the "hero" to have been dead some years before the "storied urn or animated bust" is set up in his honor there,

> Where through the long-drawn aisle or fretted vault,
> The pealing anthem swells the note of praise.

For time lends a clearer perspective to a man's character; it allows the passions of the moment to cool down. In fact in the Naval Academy Chapel there is the rule: "No memorial shall be installed in the crypt or window spaces until at least five years after the death of the officer in question." Sometimes heartbroken—and naturally biased—relatives start a controversy that sends the dead hero through another ordeal often more devastating than his recent test in shipwreck, in airplane or submarine disaster, or in battle.

From the earliest conception of a Naval Academy memorial hall innumerable officers and committees in the Navy Department and at the Naval Academy have wrestled with these ideas of honor, death in action, heroic performance of duty, etc. Without heroics they have tried to define the heroic. Secretaries of the Navy and even Congress have taken a hand in the discussions. The idea of a memorial hall seems to have been a slow development. While the word "Memorial Hall" occurs in the blueprints of the architect, Ernest Flagg, as early as 1900, this part of Bancroft Hall was also referred to in its early days as the Assembly Hall and the Reception Corridor. The latter is the designation given it as late as 1905 by Flagg in his article on the "Architectural Features of the Naval Academy" in the *Evening Mail Saturday Illustrated Magazine*.

The idea of a memorial hall as such seems to have been crystallized by an order of the superintendent of the Naval Academy, Captain W. H. Brownson, November 19, 1904, in which he requested Lieutenant Commander H. McL. P. Huse to make recommendations for the display of the old trophy flags in the new buildings then under construction.

The more salient recommendations of Commander Huse are these:

> In the old chapel, tablets and windows in memory of officers and men who fell in battle under heroic circumstances were mingled with others erected to the memory of officers and professors in no way identified with warlike deeds. Places must be provided for both classes of memorials; but a distinction should be made. Much feeling would be caused by removing from the chapel the memorials that could find no place there if heroism or great deeds must be a distinguishing feature in the

ease; it would seem simpler to remove the tablets of "heroes" to a memorial hall. In this hall might well be placed all flags and trophies commemorative of great deeds and heroic historical events.

We should thus have a chapel and a memorial hall, each with its monuments, its tablets, and its memorial windows. A third place would still be required in which to assemble all flags and other objects of naval interest which would not properly belong in either the chapel or the memorial hall. Such a place would become a most interesting naval museum.

In order to secure consistent action in admitting tablets, flags, etc., in memorial hall and the chapel, I suggest that a board of regents be constituted by act of Congress, somewhat on the following lines (no appropriation would be involved): the officer in charge of the personnel of the Navy (chief of the Bureau of Navigation); the superintendent of the Naval Academy; a graduate of the Academy to be elected by the Graduates' Association; two officers of the Navy to be selected by the President of the United States; a recorder. The secretary of the Graduates' Association might perhaps fill this position.

Memorial hall should be open to the whole Navy and Marine Corps, enlisted as well as commissioned. It would in years become a sort of democratic Westminster Abbey of the service. Its care and preservation would be in the hands of the superintendent; but nothing would find place in it without favorable action by the board of regents.

In addenda to his report, after a paragraph "establishing Memorial Hall at the Naval Academy and designating its location," Commander Huse adds:

Memorial Hall shall be, as the name indicates, a place for the collection of objects of historic interest in the Navy, such as battle flags, captured ensigns, and other trophies. In it shall be placed monuments, tablets, pictures, and other memorials to officers and enlisted men of the Navy and of the Marine Corps who have done signal service to their country in battle and have sacrificed their lives in some heroic performance of duty for which their memories should be cherished. Merely being killed in action would not justify the presence of a memorial in this hall.

In the superintendency of Admiral Brownson's successor, Captain Badger (1907-1909), Memorial Hall and the Chapel were at last slowly nearing completion. John Paul Jones, who since his arrival from France in 1905 was haunting the midshipmen in Bancroft Hall, had to wait a half dozen years longer for his final interment in his great sarcophagus in the Chapel Crypt. During these years there was much interest manifested in ways and means for honoring the Navy's heroes. On April 4, 1907, the Secretary of the Navy appointed a Board of Memorials, which was made up of the chief of the Bureau of Navigation (Rear Admiral Pillsbury), chief intelligence officer (Captain R. P. Rodgers), and the superintendent of the Naval Academy (Captain Badger). On November 23, 1907, this board made its report in which it framed the rules for memorials at the Naval Academy to the Navy's heroic dead. These rules, published by the superintendent March 15, 1908, have remained in force, with minor changes, to this day. In accord with another recommendation of the Navy Department board, Captain Badger appointed a Committee on Memorials. This committee, though its personnel have changed every two or three years, has also continued to the present time. Its primary function is to advise the superintendent and the Academic Board as to the "eligibility of the person to be memorialized."

The rules on memorials as thus laid down by the Navy Department concern themselves mainly with the question who shall be honored in the Chapel and in Memorial Hall. For instance, to have a window in the Chapel the candidates must be such as to have been generally regarded as the leading naval officers of their time, officers who "in time of war have successfully commanded a fleet or squadron in battle, or who have received the thanks of Congress for conspicuously distinguished services in time of war." Distinguished service is defined as "highly important and eminent service to the nation; heroic conduct in the performance of duty; death in the performance of duty." Somewhat similarly, Memorial Hall is reserved for "windows, tablets, portraits, and statuary of officers and enlisted men of the Navy and Marine Corps distinguished for their professional attainments and services in war; or who have died in the gallant performance of duty, or who, by character or example, are judged eligible for memorial."

This last phrase might be called an "elastic clause," and was bound to give trouble. For example, the Committee on Memorials in 1912, which was besieged by many applications for space in the new hall, declared:

It appears to the committee that should the United States engage in a serious war, the number of officers and enlisted men of the Navy and Marine Corps, who, because of the fact that they have died in the gallant performance of duty, (and the committee assumes that death in action is always death in the gallant performance of duty) will become eligible for the exhibition of their portraits in Memorial Hall, will become so large that it is

within the range of possibility to exhaust the space in Memorial Hall in the hanging of portraits of officers whose names in one hundred years will appear little, if any, in relief above those who served with them, and who were not killed. As a matter of fact all of the officers of the Navy who were killed in the Civil War are eligible to have their portraits exhibited in Memorial Hall.

The experience of the Committee on Memorials has shown that rules are more easily made than applied. It is in the application of rules to individual cases that the widest divergence of opinion has arisen. How difficult it is to apply general rules to concrete cases is illustrated, for example, by the Constitution of the United States, a brief document covering some eighteen pages, whose interpretation has filled so far 275 large volumes of the Supreme Court reports. The voluminous and difficult interpretation of late amendments to the Constitution is a matter of present-day knowledge.

With reference to this interpreting of the general rule—professional attainments and service in war or death in the heroic performance of duty—let us look at the oil portraits in Memorial Hall. All of these thirty-two paintings fall under the first part of the rule, men who have distinguished themselves in war. The better known of these thirty-odd need no apology for being in this assemblage. Their names are known in song and story: for example, Bainbridge, Barry, Blakeley, Chauncey, Cushing, Decatur, Dewey, Downes, Farragut, Hull, Jones, M. C. Perry, O. H. Perry, David Porter, D. D. Porter, Preble, Commodore John Rodgers, Sampson, and Worden. But the rest of the thirty-odd would also seem to fall under the rules. These less well-known heroes are as follows: Ensign Worth Bagley, killed on the *Winslow*, in the bombardment of Cardenas, Cuba, May 11, 1898; Midshipman Wm. R. Finch, one of Porter's officers on the *Essex* cruise; Lieutenant Commander Moreau Forrest, who was lauded for his work in the attack of the U. S. river gunboats on Hood's army in Tennessee, December, 1864; Samuel W. Godon, who fought at Port Royal and Fort Fisher in the Civil War; James T. Leonard, one of Truxtun's officers in the *Constellation-Vengeance* action in the French War; Captain David McDougal, who destroyed the Japanese squadron and forts at Shimonoseki in 1863; Isaac McKeever, who covered himself with glory at the Battle of Lake Borgne, New Orleans campaign under Andrew Jackson, 1814-15, where McKeever was severely wounded; Lieutenant John B. Nicholson, one of Decatur's officers in the *United States-Macedonian* duel in 1812, also captain of one of Decatur's ships in the Algerian War, 1815; William D. Salter, who served as a midshipman on the *Constitution* in her fight with the *Guerrière*, 1812; Thomas O. Selfridge, distinguished for his work throughout the Civil War; John Shaw, commander of the lucky little *Enterprise* in her remarkable work against French privateers in 1800; Daniel Turner, who served under Perry at the Battle of Lake Erie, 1813; and Lieutenant M. B. Woolsey, who as commander of the *Princess Royal* won distinction in the Vicksburg campaign, 1863. To sum up, all of the officers represented by oil portraits in Memorial Hall saw service in action. Practically all of these were well-known war heroes of their day.

So also the men memorialized by tablets in the hall may be classified under the one or the other of the two parts of the rule—"services in war" or "death in the heroic performance of duty." These bronze plaques tell of many a heroic deed in peace and war, in air and sea and land, from the tropics to the poles. Of the half a hundred tablets located in the east end of Memorial Hall, 25 per cent fall under "services in war." These are for the most part to officers who commanded ships in battle in the Spanish-American War, or who died as a result of encounters with submarines in the late war, or in action with insurgents in insular possessions. About half of the tablets were erected to officers who died "in the heroic performance of duty." Some of the memorialized are men who lost their lives in explosions, in target-practice accidents, and in shipwrecks, sometimes in the attempt to shield their fellows or to save the ship, and often at imminent personal risk. Some in the act of saving brother officers, or sailors, or in submarine disasters, were drowned. Three of these bronzes commemorate heroic Polar explorers—Wilkes, Putnam, and De Long. A scant half dozen tablets are to men who had won no distinction in the Navy and who died in some accidental manner or of disease.

Many of the above tablets were erected by classmates, who are naturally more critical than the relatives of the victims of fate. In

cases like target-practice disasters and shipwrecks, the exact facts often cannot be established. When a submarine suddenly sinks never to rise again, who but the Recording Angel can tell what deeds of self-sacrifice or cowardice took place in the interval before a lingering death from suffocation claimed the last survivor? In such cases is it not proper to give the dead the benefit of the doubt? Those who knew the man intimately, his classmates and shipmates, have deemed him worthy of honor. When such brother officers say in letters of bronze: "He died at his post carrying on the Navy's work," or "His was the spirit that makes the service live," they bear witness to their belief that the one honored played the game and died a hero's death. Moreover, in the case of unknowable circumstances regarding the death of the man memorialized, it is well to remember, as one tablet puts it: "They died that battles may be won." For them sham battles were real battles.

In addition to the tablets and portraits, Memorial Hall can boast of only three pieces of statuary thus far: the busts of John Paul Jones and Robley D. Evans (the latter of whom won distinction at the battle of Fort Fisher, 1865, and at Santiago, 1898), and the full-length statue of Commodore George H. Perkins (noteworthy for his heroism and skill at the Battles of New Orleans and Mobile Bay). Mr. Flagg, the architect, designed the niches in Memorial Hall for statuary. He also planned the great panels for mural frescoes of allegorical subjects. When the ten millions of dollars appropriated for the new Academy were exhausted, these mural paintings had to be abandoned. In fact many other original plans for the new buildings were sacrificed in the interest of economy; for instance, in place of the granite and the stone ornamentation in the earlier work, brick and even stucco unadorned were used in the later stages of construction. Again, some early ideas included the Navy's trophy battle flags in the decorative schemes for Memorial Hall, the Chapel, and the Crypt. But here again expense was a deciding factor. In 1912 Congress finally appropriated $30,000 for the 173 flags on hand at this time. With this money these ensigns were restored and mounted in Mahan Hall. Among other schemes, for decorating Memorial Hall in particular, was a plan to make a museum of it. This was tried for a while and found to be a failure, not only because the architecture was sacrificed, but also because the museum cases, guns, etc., cluttered up the hall and so interfered with its use for assemblies. Still another suggestion sometimes made was to decorate one wing of the hall with great paintings of war and battle scenes. Thus far three pictures of this kind have found places there. One of them, a rather crude piece of work, portrays the fight between the *Constitution* and the *Guerrière*. The others are two of Gribble's World War paintings—"Rescuing a Seaplane" and "The Return of the *Mayflower*."

In 1924 the superintendent appointed a committee to consider once more ways and means for decorating Memorial Hall. This committee made the following suggestions: Memorial Hall should be consecrated as a shrine to preserve the best traditions of the Navy. The decorations should be simple; only such trophies should be placed here as would be consonant with the architectural design of the whole. The best scheme for decoration would be mural paintings, by noted artists, representing the outstanding naval engagements in our history. Bronze statues of our greatest naval commanders should occupy the niches. This plan could be carried out only by a large appropriation from Congress, or by contributions from alumni, friends of the Academy, and historical societies. As an alternative plan, the committee suggested that the recent accessions of battle flags be mounted in glass cases countersunk in the panels. An interior decorator estimated that this work, if done in such manner as to harmonize with the architecture, would cost $12,000. The committee further suggested that portraits and statues at present in the main part of the hall should be removed to the west alcove, which should be a gallery for paintings of naval engagements and portraits of the outstanding officers of the Navy.

As this report entailed the expenditure of money—much money—the superintendent decided the only course left was to continue the policy followed heretofore, that is, to rely on the generosity of alumni, public spirited citizens, and patriotic societies for gifts of statuary, tablets, oil portraits, and paintings.

After all a Westminster Abbey, or even a small replica of it, cannot be built in a day. Those who would create a great memorial

must have an eye on posterity. The idol of the moment, raised aloft by fickle popular acclaim, often fades into oblivion, in comparison with the abiding qualities of the truly great.

To build a worth-while memorial it is sometimes helpful to see how others have done it. For instance, West Point's Cullum Memorial Hall, which owes its existence to the generosity of General Cullum, was completed about the time that the Naval Academy's hall was first conceived. In fact, the earliest committees on a memorial for the Navy took into consideration the underlying ideas of the new hall at the United States Military Academy in formulating their own rules. Those entitled to tablets in Cullum Memorial Hall fall under the following classes: those who have attained and honorably held the full rank of major general; those graduates who have been killed in action, or who have received the thanks of Congress or the United States medal of honor; or finally those graduates "who by special act of heroism or by reason of special eminence are deemed worthy of memorialization by the Academic Board." As regards the Chapel at the Military Academy, its great south window was dedicated to those graduates who died prior to its installation, and the north window to those who died in the World War. The reredos is in memory of Generals U. S. Grant and F. D. Grant. The policy for the West Point Chapel is generally in favor of group rather than individual memorials.

As another example we might consider briefly the Chapel of the Royal Naval College, Dartmouth, England. Of the regulations for this Rear Admiral M. D. Nasmith writes: "There are memorial windows and brass memorial tablets. There are no fixed rules as to the admission of memorials except that the person must have been intimately connected with the Royal Naval College at some time. Each case is judged on its merits."

The Hall of Fame of New York University affords perhaps the best-known example for honoring the leaders of the past. This idea originated in a gift of Helen Gould of $100,000, which provided for the ultimate selection of 150 great Americans from all walks of life. Accordingly, five candidates for memorial tablets have thus far been chosen every five years by a body of one hundred electors, themselves the leading representatives of the various classes honored, for example, authors, statesmen, scientists, etc. It requires a three-fifths vote of this electorial college to make a choice. It is hoped that the list of 150 tablets will be complete by the year 2000. No candidate is considered until the lapse of twenty-five years after his death. Of the class sailors and soldiers, five have been picked so far as follows: John Paul Jones, Farragut, Grant, Lee, and Sherman. Of the two sailors Jones received sixty-eight votes and Farragut seventy-nine.

So much then for the methods of others in choosing great leaders. The criticism has often been heard of late years that there are many in the Naval Academy's Memorial Hall who ought not to be there. But this criticism is hardly well taken. The candidate has to run the gauntlet of the Committee on Memorials, the Academic Board, and the superintendent. A careful survey of those honored so far by memorials tends to show that these various officials have generally made their selections in an unprejudiced and conscientious manner. A fairly real but extreme illustration of their occasional difficulties is the following: a devoted daughter of a father who went through the Civil War with considerable distinction offers a crude oil portrait of him with the request that it be placed in Memorial Hall. The superintendent finally accepts it but with the understanding that it may not be permanently located in the hall. As a portrait by a first-class artist costs from $3,000 to $5,000, one that is valued at a couple of hundred dollars makes an awful contrast next to a Jarvis or a Gilbert Stuart canvas.

The superintendent of the Naval Academy and his advisers have of course the final responsibility in selecting those who shall be honored in Memorial Hall. But undoubtedly they will be glad to receive from the service at large any constructive suggestions. A discussion in the columns of the NAVAL INSTITUTE will help the Academy authorities in this problem of building a great and lasting memorial to the Navy's heroic dead.

Here *and* There

Sketches from a Naval Officer's Notebook

By Rear Admiral George R. Clark, *U. S. Navy (Retired)*

An Inevitable Collision

THE *Wachusett* had made a delightful cruise among the South Sea Islands. Samoa, Tahiti, and the Marquesas, far from the madding crowd, basking in the sun, care free and happy, had made us think more kindly of the *Bounty* mutineers and inclined our hearts toward a more tolerant view of the simple life led by the people in these far-away isles, the world forgetting and the world forgot. But now a new page had been turned and the pleasant memories of dreamland were growing fainter as we approached the shores of Peru, the land of romance, of daring, adventure, and conquest.

The officer of the forecastle, getting in the way as usual, of the real workers intent on their morning watch duties, but with a sincere desire to do his bit, splashed around barefoot in the warm sea water, and glanced occasionally at the distant horizon. At length he was rewarded by the sight of a sail—dim and faint, it is true, but unmistakably a sail. Here was something to do. "Sail, O!" he shouted to the officer-of-the-deck, "Broad off the starboard bow, sir!" With amusement he recalled a story he had heard of an entry in a log book wherein it was recorded by the officer that at sunrise he "sighted a sailing ship hull down on the horizon and knew that a collision was inevitable." Then, little dreaming of what was in store, he dismissed the incident from his mind and resumed his playful duties.

Later on, incredible as it may seem, the ships, the only ones in sight in that part of the broad Pacific, came together, and then things happened.

The captain appeared, clad only in a long white nightie, and was soon joined by a self-appointed Board of Strategy to go into conference. First, the executive officer, stern of mien and ready to apply the axe impartially to all and sundry, hove in sight, closely followed by the navigator, vaguely wondering if he were out in his reckoning. The marine officer, abruptly aroused from dreams of the Halls of Montezuma, and eager to uphold the traditions of his gallant corps, placed himself near the "old man," ready for what might befall. Then the chaplain emerged from below, ready to perform the rites of his priestly office, and the paymaster with a bag of coin to bestow, no doubt, upon the author of all the trouble as a prize for accomplishing the impossible. And last, as befitted their lowly estate, tumbled up the youngsters from the junior officers' mess, anxious to see if things were to be done according to Luce, and ready to contribute from their store of knowledge recently acquired at the Naval Academy. In the midst of this noisy and questioning group was the Beau Brummel of the ship, a lad distinguished for his correct attire and upright behavior. On this occasion, alas, he was properly attired in all respects except as to his legs, which, owing to lack of time, were clad only in nature's garb. On his arm dangled a pair of trousers, and at his feet, barking and cavorting in a state of pleasurable excitement, was the beau's inseparable companion, his pet dog. Seeing his master's grotesque attempts to complete his toilet while balancing on one foot, a difficult feat under the trying conditions, his dogship, thinking it all in sport, caught the spirit of the game and the trousers at one and the same time and dashed below closely followed by the beau, who having contributed his mite to the interest of the occasion, faded from the picture.

Meanwhile the Board of Strategy having exhausted all means of separating the ships, gazed helplessly at one another and hoped for better days. Finally a puff of wind carried the bow of the unwelcome visitor clear and started her on her erratic course.

Our loss included two boats, several bent and broken bulwark frames, and many hurt and lacerated feelings. Some one hoisted an international signal asking the barque if she needed assistance, which so far as we could see was treated with lofty disdain, and the question remains unanswered to this day. It was thought, however, that her greatest injury was to the temper of her skipper, whose language during the altercation between the ships was sorely lacking in restraint and delicacy and so rich in picturesque adjectives as to be unfit to print.

When the shouting and the tumult died our ship was again headed for the land of Incas, and the officer of the forecastle, idly pacing the deck, pondered the extraordinary happenings of the morning and longed for the ability to paint the scene and call the picture, "Ships that *don't* pass in the night!"

Divining the Future

Many years ago (why be particular about the exact number) the U.S.S. *Trenton,* the first warship of any nation equipped with electric lights, fitted out at the Norfolk Navy Yard for a cruise that promised to lead to interesting and pleasant waters. However, from rumors rife at the time, the first leg of the voyage was to be of such a nature as to dampen the enthusiasm of officers due for sea. The first duty of the noble ship was to take a draft of men and officers to relieve those on board the U.S.S. *Lancaster* lying at Rio de Janeiro, then to return to a home port and prepare for a cruise in the Mediterranean. The danger to those without influence was of being among those left on the South Atlantic Station, a very unpleasant cruising ground in that period of yellow fever, black smallpox, and blue days. It was much better, thought the timid ones, to side-step the Rio trip and make sure of the Mediterranean part of the cruise. Why not have things pleasant while you are about it? Life is short and cruises are long, reasoned the careful and cautious, who at once bombarded the Navy Department with appeals for a change of orders.

When the smoke of the barrage cleared away it was found that 50 per cent of those first gained their ends, and the *Trenton* sailed away with replacements made up of the silent, simple, and satisfied. A compromise was made in the case of a few who were assured of a return in the *Trenton.* The lordly and patronizing airs of this favored group did not tend to lessen the gloom of their less fortunate shipmates, a gloom that deepened when, on arrival at Rio, it was learned that yellow fever was raging in the city and smallpox was taking the joy out of life aboard the U.S.S. *Alliance,* a gunboat to which two of us were transferred on the following morning. As we went on board over the starboard gangway, two victims of the dread disease were carried away over the port gangway. That, as noted at the time by a wag, left the total number on board unchanged, a pleasing coincidence.

A few days later, from a shunned and remote corner of the harbor, the *Alliance* witnessed the departure of the *Lancaster* for Montevideo, while the *Trenton,* with band playing and homeward-bound pennant flying, sailed gaily away for home. Then was the winter of our discontent.

Rio is justly ranked high among the beautiful harbors of the world, but we should not be blamed if, at that time, we failed to be impressed with the attractions of mountain and sea. We summoned philosophy and fatalism to our aid and affected an indifference we did not really feel. The most consoling thought, after all, was that things could not be worse. A cruise at sea, touching at Bahia and Pernambuco, finally cleared the ship of disease, and after a time we found ourselves gingerly admitted to the company of the *Lancaster* off Montevideo.

Not long thereafter several hoists of fluttering multicolored signal flags directed that the two marooned officers be transferred at once from the *Alliance* to the *Lancaster.* There it was learned that the flagship was under orders to proceed to sea to a certain latitude and longitude, open a sealed envelope and be governed by the orders found therein—a situation full of mystery and pleasing possibilities. What a shout went up and what a grand and glorious feeling filled all hearts when the carefully guarded missive proved to be orders directing us to proceed to the Mediterranean for duty as flagship on that playground of the world.

And now! Many months later we learned that on a certain day in the past two ships crossed the equator, one, the *Lancaster,* bound north to a station where life was one glad song, and the other, the *Trenton,* not many miles away, bound south to her doom in far-away Apia.

This episode was not unlike one in which many years later the same officer took part. There at San Francisco, unhappy and depressed at the prospect of what he, in his infinite wisdom, thought would be a dreary and uninteresting cruise, he busied himself with efforts to gain a transfer to the *Philadelphia,* flagship of the Pacific squadron then preparing for a South Sea cruise. His plan fell through, and several months later while serving on the Asiatic Station he was given food for serious and sober thought on reading that the officer whose billet he would have filled on the *Philadelphia* had fallen in battle with the Samoans.

The lesson to be learned? Well, as Captain Cuttle would say, "The bearings of this observation lays in the application on it."

Crowns

On a day in the long ago it was the good fortune of a young naval officer to take part in the ceremonies attending the coronation of Kalakaua, King of Hawaii, the land of liquid sunshine and soft breezes, summer skies and sweet music, of rainbows in the valleys, and friendly greetings everywhere. The ceremonies, dignified in character as they were and marked by all the pomp and circumstances of monarchial procedure, made a deep and lasting impression on the observer, an impression that was to be recalled later by a widely different scene.

Many years after the gold crown had been placed upon the head of Kalakaua, the first of the dynasty, the last of that royal house, ex-Queen Liliuokalani, not reigning then, it is true, except in the hearts of her devoted people, passed away and was carried to her last resting place beside her predecessors. The same officer who had been so deeply impressed with the regal and joyous ceremonies attending the beginning of the reign, was, thirty-six years later, by a strange turn of fortune, present at and took part in those that marked the ending of that reign. As the catafalque that had borne the remains of the ex-queen was withdrawn from the cemetery its surmounting wooden crown was caught under an overhanging branch and thrown to the ground where, in the dust, it rolled to the officer's feet. Truly a dramatic incident ending a period that witnessed the passing of crowns of gold to crowns of wood, the change from triumphant shouts for the mighty to sorrowful wails for the dead. "The Captains and the Kings depart—"

Doubtless to many on the night of wailing that followed that memorable day were recalled the words of Lincoln's favorite hymn, "O, why should the spirit of mortal be proud!"

Captains Cautious and Courageous

Commanding officers while resembling one another in a few respects often differ most widely in others. Perhaps it is just as well that this is so for if they were all of the same mold, or even similar, as to methods and characteristics, life for the juniors would lose the zest and interest that come with the varied types of captains that appear and disappear in a fast-moving procession while the junior remains on a full cruise. This very variety of traits is helpful in teaching both how and how not to do things. Calmness and coolness may be learned from one while vigor and resoluteness mark the character of another. An observant and discriminating youngster thus has presented before him opportunities—often, alas, neglected—for shaping a course blending the best characteristics of his seniors.

These observations are prompted by recollections of a Pacific cruise in prehistoric times when four commanding officers—Lull, Glass, Pearson, and Mahan—served in succession as chief of operations on board the U.S.S. *Wachusett.*

Lull, rotund, bewhiskered, benevolent, cautious, was the first to ascend the throne, from which he ruled with a kind and gentle hand. Bad weather made him unhappy and apprehensive, while sun and calm filled his soul with gladness and content. He was quite satisfied to surrender all rights concerning deep water to the whales and other denizens of the sea so long as he might keep in sight of land where his great abilities as a surveyor found a natural field for their exercise. The beginning of an Alaskan winter found us, while still under this dynasty, moored off Sitka all snug and safe, sails and rigging ashore in the storehouse, the prospect of an easy and restful season before us, our director at peace with mankind, when along came—

Captain Glass, alert, energetic, daring, untiring. Back came the sails and rigging, the stores and provisions, and we were off to a winter's cruising in deep and narrow chan-

nels, while snow and wind and darkness hedged us about, all hands filled with wonder the while that such things could be. "I am glad that this has happened," remarked the new director on a particularly trying occasion, "for I did not know whether I had the nerve for it. I find that I have." His hearers made no comment but thought deeply and wondered how the same school could turn out so many different types.

Came Captain Pearson, tall, distinguished, dignified, faultlessly attired, precise of speech and manner, little known at the time but with a record of twelve continuous years of shore duty. "Now what shall we get?" asked all hands. "Easy work now; he will probably be seasick all the time," said Jack. Not at all! While not claiming to be a Nelson or a Luce, he was so blessed with good common sense, such a knowledge of human nature, and such a correct estimate of his own merits and deficiencies, that he soon had the confidence and respect of all his subjects, who were ready to follow wherever he might lead. "Is the bureau right, did we really neglect that regulation?" said he to his young aide, who was worrying over a reproof from the Navy Department. "Yes, sir, I am afraid we did." "Well, then, tell them that we did and that it will not occur again. There will be no reply, for that admission and promise will close the incident." Thereupon he lighted his cigar and turned his attention to other matters. Truthful, honest, and sensible! No wonder he kept his health and good looks!

In due course it came time for Pearson to return home and he was relieved by A. T. Mahan, who, of course, needs no introduction. That distinguished officer, modest, courteous, considerate, unmistakably a gentleman, assumed command off Callao, Peru, far from the home he loved so much and for which, even in the busiest times, he never ceased to long. "What a life for a family man, Pearson," he remarked with a tremble in his voice as the latter in his faultless civilian clothes took his leave at the gangway. The new chief was even then turning his mind and pen to the line of work that was afterwards to make him famous, but, nevertheless, he was far from neglecting the duties that demanded his attention on his new station. This was all the more to his credit if, as some believed, his heart and real interest were elsewhere.

These four men representing as many distinct types, bore themselves most worthily (if, in my presumption, I may be permitted to judge them), upheld the traditions of the service each in his own way, and, although differing so widely in many respects, were alike in their unwavering loyalty and devotion to duty.

A Look Over the Side

The *Yorktown* had completed her task of finding and rescuing the merchant steamer captured and beached by the Filipino insurgents, and was lying at anchor in Lingayan Gulf waiting for favorable weather in which to tow her prize to Manila. So far as outward appearances went the world was at peace; a gentle breeze tempered the heat; quiet reigned on the near-by beach, where not a single moving figure could be detected by even the best of our keen-eyed quartermasters. The crew were lazily taking their ease under the protecting awnings, when the officer-of-the-deck, moved by a fortunate impulse to take a look over the side, mounted to the bridge and swept the gulf to the westward with his glasses. It was well that he did for there, in plain view, was a British man-o'-war, a bone in her teeth, headed at a high speed directly for the *Yorktown* anchorage.

Now, lying between the stranger and the *Yorktown* was an ugly reef completely hidden in calm weather by the few feet of water by which it was covered. To the growing amazement of the deck officer, on came the warship, heedless, apparently, of the danger in her path. Suddenly the officer, sensing disaster, shouted to the quartermaster to hoist the international signal "You are standing into danger," fired a blank charge from a 6-pounder, and rushed to the cabin to report his action. There he met a mild reproof from his captain, who observed dryly that the English were good navigators who knew their way about and might resent suggestions from young and over-zealous Americans. "Nevertheless, captain," replied the unabashed junior, "that same good navigator will be on board before long to thank the *Yorktown* for saving him from a sorry wreck."

And thus it proved. The Briton on seeing the signal, stopped, lowered a boat, and investigated with lead and line. Then, rounding the southern end of the reef, he

anchored near us, and the captain and navigator came on board with many and hearty thanks for saving their ship. "In a few minutes," said Captain K-H of the *N*—, "we should have been hopelessly wrecked." It transpired that the Briton, homeward-bound from Manila, had been entrusted with mail to deliver to us, and on sighting the *Yorktown*, believing that she was anchored to seaward of the reef, had headed straight for us.

A few months ago the officer who had the good fortune to be of service to the *N*—, now somewhat grayer but still with a zest for reading, read somewhere that a young daughter of Captain (now Rear Admiral) K-H, had won great fame as the writer of a work of fiction. With old and pleasant memories revived, the party of the first part is now trying to get in touch with his friend of earlier days to congratulate him on his daughter's success and to express the hope that he is in the harbor where he would be with sometimes a thought for his friends of long ago. Verily, service people in their time play many parts.

A Cup of Coffee

The long and trying official day was drawing to a close as the head of a bureau in the Navy Department sat in his office thinking of his many callers, statesmen, and near statesmen, all sorts and conditions of men, threatening or requesting, truculent or beseeching, belligerent or pleasing, as seemed best suited to their several needs according to their various moods and temperaments. Pope was right, he thought, "the proper study of mankind is man," and the national capital is the school ground thereof. Dejected and disillusioned, he was about to call it the end of an imperfect day when in came another, easy of manner, clear and concise as to speech, respectful in bearing, and with an air of quiet dignity. "Sir," he said, "I have come to you with a request for help. I am emboldened to take this step by the remembrance of an incident that occurred many years ago. I am employed at the navy yard where there is a vacancy in a better-paying billet for which I am eligible, but am told that I must have recommendations from former employers or associates. You don't remember me, I dare say, but in the Spanish War I served under you on the *Puritan*. One rainy and unpleasant morning you were officer-of-the-deck and sent your mess boy for coffee and rolls. As the boy was leaving the bridge you said to him, 'Fetch some hot coffee and rolls for those two quartermasters!' Sir, I was one of those quartermasters, and remembering the incident all these years, have never lost track of you. That is why I knew where to come today."

After the visitor had gone the officer, with a new and pleasing turn to his thoughts, gazed out of the window to the westward where the clouds were breaking away, giving every promise of fair weather for the morrow.

The Concern *of the* Astronomer *and* Navigator with *the* Law *of* Relativity

By GLEN H. DRAPER, *Junior Astronomer, U. S. Naval Observatory*

SO MUCH is being spoken and written in both a highly technical and a popular vein about relativity that the theoretical astronomer and navigator is forced to take account of stock at increasingly frequent intervals, lest he find himself caught with an array of discarded concepts on his mental shelves.

When relativity is mentioned, we think of Dr. Einstein and associate the word with a theory that as often as not bears his name. We should keep in mind, however, that the law of relativity is as old as the world. In its simplest form, it may be stated this way: "There are always two parties to every observation—the observed and the observer."

The basic formulas employed in the positional problems of the solar system are derived from what are ordinarily referred to as Newtonian concepts. The laws of Newton serve us well, except for the orbit of Mercury and the orbit of the moon. The Newtonian world is tridimensional. The Einsteinian continuum is polydimensional. There are certainly many practical considerations that make it desirable for the positional astronomer and for the navigator to cling to the tridimensional concept. If perchance these practical considerations can be supported by acceptable philosophical and mathematical reasoning, we can still dwell with confidence in a physical cosmos governed by understandable laws of cause and effect, especially if our reasoning responds also to experimental fact. The theory of uncertainty to which many physicists are for the moment receptive can have no appeal for the navigator on soundings or off.

In the light of our present knowledge of the physical universe, it is not difficult for us to accept the thought that it takes force time to act. It is essential that we accept this as a fact, if we accept the results of experiments in the electromagnetic field of which Newton could have had no possible knowledge. Just as Newton, however, did not accord to light a sufficient time to travel, so also he accorded to gravity no time whatever to act. In other words, the Newtonian mathematics is predicated on the assumption that a center of force may be responsible for instantaneous action at a distance.

For as long as men accepted that the world was round or spherical, they knew by observation that falling bodies directed themselves toward the earth's center. Yet Newton was the first man who stated in a definitive way the law of gravitation. Observations for centuries have indicated that the orbits of the planets about the sun are rotating ellipses. Hence there can scarcely be a question but that the equation of their orbit must be of the form:

$$\frac{1}{\rho} = u = a + b \cos g\theta$$

which is the polar equation of a rotating ellipse,

where ρ is the radius vector;
u is its reciprocal
a is the reciprocal of the semi-latus rectum
$-b$ is the eccentricity divided by the semi-latus rectum
θ is the angle about the center of mass from the initial aphelion point to the radius vector.
g is the factor in the argument of the cosine whose departure from unity indicates the extent of the rotating motion of the apses.

A consideration of the Maxwell electromagnetic theory, the mathematics of which in relation to the forces here dealt with parallel the Einstein mathematics, gives us warrant for accepting that these forces travel with the speed of light. In consequence, we must have an aberration of force, which, in the case of the force of gravity in space, may be expressed by

$$vF_\rho/c,$$

where v is the velocity of the body in the direction normal to ρ,
c is the speed of light,
F_ρ is the force of gravitation.

That space has directional properties is borne out by a number of physical experiments, notable among which, and very conclusive, is the experiment of the Foucault pendulum. If then we view inertia as a property of space, we have a reasonable explanation for the resistance known as hysteresis. This resistance n the case of celestial motions varies as the inverse square of the distance from the center of force and some function of the velocity. It may properly be expressed by $f(v)/\rho^2$.

The forces arising from aberration on the one hand and hysteresis on the other are oppositely directed and give rise to the resultant

$$F_\theta=\frac{1}{\rho}\frac{d}{dt}\rho^2\frac{d\theta}{dt}=\frac{v}{c}F_\rho-\frac{f(v)}{\rho^2}.$$

Now observations so far have indicated that the law of constant areas is a general law; that is,

$$\rho^2\frac{d\theta}{dt}=h$$

is an equation that is fulfilled by all celestial bodies. Therefore, the resultant represented by F_θ equals zero. It would appear to follow from the law of the conservation of energy that the resistance of hysteresis should be balanced by the acceleration due to aberration. It is conceivable that future observations may indicate some want of balance that will bring into question the absoluteness of the law of constant areas. At present, however, observations do not deviate from calculated or predicted results.

These preliminary considerations lead directly to an expression for the force of gravitation to produce the results obtained from observations, which takes the following form:

$$F_\rho=-h^2u^2\left(\frac{d^2u}{d\theta^2}+u\right)=\psi(\rho, c)$$

which latter expression is a function of the distance ρ and the velocity of the force action c. Substituting the equation of the orbit in the differential equation of F_ρ, we find that the expression of gravitation to produce this observed motion is

$$\psi(\rho, c)=\frac{\mu}{\rho^2}+\frac{\nu}{\rho^3}$$

$$=-\frac{k^2}{\rho^2}\left\{1-\frac{n}{c^2}\left(\frac{d\rho}{dt}\right)^2-\frac{n\rho}{c^2}\frac{d^2\rho}{dt^2}\right\}$$

in which

$$a=\frac{k^2(c^2-v_0^2n)}{c^2h^2-2v_0hnk^2+nk^4}=\frac{-\mu}{h^2+\nu}$$

$$b=-a+\frac{v_o}{h}$$

$$g^2=\frac{c^2(c^2h^2-2v_0nhk^2+nk^4)}{(c^2h-v_0nk^2)^2}=1+\frac{\nu}{h^2}$$

$$\nu=\frac{-nk^4h^2(v_0^2n-c^2)}{(c^2h-v_0nk^2)^2}$$

$$\mu=-h^2ag^2$$

where ν, μ, k^2, and n are constants of integration and proportionality, and v_0 represents the velocity of aphelion passage.

A comparison of this expression of gravitational force acting between celestial bodies with the relativistic deductions applied to Kepler's laws, as given in Arnold Sommerfeld's *Atomic Structure and Spectral Lines* (Eng. trans. Methuen & Co., 1923), page 467, will serve to indicate that the Einstein mathematics approximates this more exact and definitive result. Perhaps a better comparison is made by considering the *vis viva* integral and the law as given in Eddington's *Mathematical Theory of Relativity* (Camb. Univ. Press, 1924), Eq. 38–8.

It is at this point that the astronomer and the navigator should note a feature that has apparently been overlooked in a too rigid acceptance of Newton's con-

cepts. The elements of the earth's motion are known with presumably greater accuracy from the standpoint of astronomical observations than those of any other body. The orbital elements of the moon, our nearest celestial neighbor, should be known with practically equal accuracy. Why the wide discrepancy? It is believed that the explanation is found in the following considerations.

The elements of the earth's motion are employed in such a way as to satisfy the law expressed by the formula,

$$F_\rho = -\frac{k^2}{\rho^2}. \qquad (1)$$

If the law governing planetary motions is correctly expressed by this formula, it follows clearly that an employment of the constants which are derived from the observed motion of any one of the bodies should equally satisfy each of the others in their respective motions. This is not borne out by astronomical observations.

From a consideration of the equation,

$$F_\rho = -\frac{k^2}{\rho^2}\left\{1 - \frac{n}{c^2}\left(\frac{d\rho}{dt}\right)^2 - \frac{\rho n}{c^2}\frac{d^2\rho}{dt^2}\right\} \qquad (2)$$

we see that for a body moving in a circular orbit about the central force the law expressed by formula (1) above is fulfilled exactly. The earth's orbit is made to fit it, although the earth's orbit is not circular. Planets with orbits approaching in their elements the orbit of the earth will show little departure from this law, but an orbit such as that of Mercury will show a considerable discrepancy.

The discrepancy will disappear, if formula (2), taking into account the considerations set forth above, is employed. In the case of the moon, the still wider discrepancy will presumably also be brought into such limits as will vindicate this Newtonian approach to a solution of the moon's orbit in contradistinction to an Einsteinian approach.

After all, the physical universe is the same universe today as it was in the days of Newton or even Euclid. The physical laws governing it do not change because Riemann devises a new geometry as acceptable mathematically as the geometry of Euclid. In other words, mathematical knowledge of the physical laws governing our universe or all of the physical universes we may conceive to exist does not alter the action of these laws. Such mathematical knowledge, no matter on what postulates it may initially be predicated, affords only a means of indicating events in the physical continuum that will happen or that have happened in the unrecorded past.

The mathematics pertaining to any physical law is merely a statement or series of statements in symbols which appeal to the human mind as a logical presentation of the law. Contrariwise the verbal expression of the same law is a logical exposition in words of how some definitive mathematical formula works. That is to say, speaking mathematically, if we are given results as an hypothesis, we should be able to trace back by logical mathematical concepts to the causes; or given the causes in a mathematical setting, we should be able to determine the results mathematically. For instance, if we obtain the elements of an orbit by observation and express that orbit mathematically, it should be possible and we know it is possible, accepting the law of cause and effect, to express mathematically the forces which are acting to produce this orbit. Correspondingly, if observations can determine for us sufficient data concerning the force of gravitation, then it should be entirely possible to express the resultant orbital paths of bodies affected by this force in appropriate mathematical formulas. Investigations in the electromagnetic field reveal the technique of ascertaining such forces and their character. We are stating, in short, that mathematical theories ought properly to be reversible, because we believe the law of cause and effect is an absolute law.

The theory of relativity, in its present stage of development, is in many respects a one-way theory, affording to physical quantities no definitive meaning. Until the theory passes through this stage, the astronomer is on safe ground, if he holds to a mathematics that enables him to predict logically the ephemerides of the future rather than to geometrize uncertainly the physics of space.

NOTE. By a comparison of the basic formula here submitted with that part of the theory of relativity which has a physical significance, the abstract constant n is found to have a value of minus six.

Arnold's Retreat *from* Valcour Island

By L. H. BOLANDER

DURING the Revolution there were but two naval engagements of major importance—if by that term we mean operations directly affecting the result of the war—the first at Valcour Island in Lake Champlain on October 11, 1776, and the second between the French and British fleets on September 5, 1781.

The former engagement, though ending in disaster for the American fleet, delayed the British force under General Carleton until the early northern autumn. It compelled the British to forego for that year their plan of gaining control of the Hudson valley and cutting off New England from her sister states. The time for preparation thus gained by the Americans made Saratoga and the French alliance possible.

The details of the battle have been told many times by able historians, and need not be repeated here. During the summer of 1776, the sight was presented of two commanding generals building naval armament to contest the supremacy of the lake; one, General Arnold, commanding the American forces at Skenesborough, at the southern end of Lake Champlain; and the other, General Carleton, commanding the British forces, at St. John's at the lake's northern end. Arnold was ready first.

By Herculean efforts he had created a fleet consisting of two schooners, the *Royal Savage* and the *Revenge,* a sloop, the *Enterprise,* four galleys, and eight gondolas, mounting in all eighty-four guns, and manned by about 500 men, most of whom were raw militia, with little or no nautical experience. Captain Thomas Pringle, of the British Navy, in command of the naval force under General Carleton, had at his disposal besides the flagship, the three-masted *Inflexible,* two schooners, the *Maria* and the *Carleton,* a large gondola, the *Loyal Convert,* a floating battery or radeau, the *Thunderer,* and twenty gunboats mounting about the same number of guns as the American fleet, and manned by 700 veteran British seamen.

On September 3, Arnold anchored his little fleet five miles south of St. John's, from which advanced position the enemy's shore batteries forced him to retire on September 23, to Valcour Island, where, in a small bay on the western side of the island he awaited the British advance. Valcour is about two miles long, and from 100 to 180 feet in height. Its southernmost point is about three-fourths of a mile from the western shore of the lake. Midway on the western side of the island a peninsula projects into the lake for about one-fourth of a mile, making the distance from the island to the mainland at its nearest point only half a mile. It was in the bay formed by this peninsula that Arnold determined to make his stand. Owing to the height of the island, his position would be invisible to an enemy traversing the main channel of the lake.

On the night of October 9, the British fleet sailed from St. John's, and advanced to the channel between Grand and Long Islands, where they anchored on the night of the tenth. The next morning, with a strong northeast wind in their favor, they got under way, and, as they advanced, scanned the shores of Grand Island, where they supposed Arnold to be awaiting them. It was not until their fleet had passed some distance to leeward that the American position was discovered, when they had to haul up on the wind and slowly beat up to the bay where Arnold's fleet lay. In the day's action that followed, Arnold lost about eighty men killed and wounded out of his force of 500, and two of his vessels, including the *Royal Savage,* were totally destroyed. Most of his other vessels had been damaged not a little. The British lost about forty men in killed and wounded and two gunboats.

The action ceased with the early autumn sunset. The two fleets anchored within a few hundred yards of each other. Captain

Pringle, in his report to the Admiralty four days later, wrote: "I called off the *Carleton* and gunboats, and brought the whole fleet to anchor in a line as near as possible to the rebels that their retreat might be cut off."

This line extended from Garden Island, a small islet a few rods south of Valcour, to the shoals near the mainland, for the double purpose of being in a position to renew the attack with the coming of dawn, and to guard against the escape of the American squadron. The radeau was moored at the extreme right of the British line close to Garden Island, and the larger vessels were anchored in a line extending westerly to the shoals, while the intermediate spaces were covered by the gunboats. Thus a line was established, impenetrable and compact.

Baron Riedesel, commander of the German contingent under Sir Guy Carleton, says in his memoirs: "The latter (the English fleet) immediately formed in line of battle in front of the bay, their left wing resting on the shore, and their right on the Isle de Valeur (Valcour Island). At the same time several vessels were sent to the right to cut off the escape of the enemy's ships through the passage formed by La Valeur and Grand Islands."

The outlook for Arnold and his men on the night of the eleventh was not a comfortable one. To fight the next day was impossible as three-fourths of his ammunition was already expended. Escape by land was also impossible, as the forest on the mainland swarmed with hostile Indians. Escape by water seemed not less impossible, for the British ships were anchored in a compact line only a few hundred yards south of their position, and were presumably keeping vigilant watch. But Arnold was a man whom nothing daunted and who never knew when he was beaten. He says: "On consulting with General Waterbury and Colonel Wigglesworth, it was thought prudent to return to Crown Point, every vessel's ammunition being nearly three-fourths spent, and the enemy greatly superior to us in ships and men. At seven o'clock Colonel Wigglesworth in the *Trumbull* got under way; the gondolas and small vessels followed; and the *Congress* and *Washington* brought up the rear. The enemy did not attempt to molest us."

But by what route was this retreat conducted? Arnold, writing on the twelfth, after a day of terrific labor and excitement and two sleepless nights, was in no condition to give a detailed account of the maneuver. He gives us the outline and leaves the details to our imagination. Did the little American force slip through the strong British line anchored just south of them, and aided by the darkness and fog of the night escape undetected? Or did they drift with the current to the north end of Valcour, and then setting sail with a strong north wind at their backs, and hugging close to the shore of Grand Island, slip past the British vessels?

General Waterbury, in his report to John Hancock fifteen days later, says: "We immediately held council to secure a retreat through their fleet, to get to Crown Point, which was done with such secrecy that we went through them entirely undiscovered.

The early historians like Cooper are silent altogether on this point. Dr. Lossing, writing in 1851, says: "Anticipating such a movement on the part of the Americans, the British commander anchored his vessels in a line extending across from the island to the mainland. A chilly north wind was blowing all the afternoon and about sunset dark clouds overcast the sky. It was the time of the new moon, and therefore the night was very dark, and favored the design of Arnold. About ten o'clock* he weighed anchor and with the stiff north wind sailed with his whole flotilla through the enemy's lines."

Many writers in the years following accepted his statement without investigation, though Dr. Lossing himself, in later years, as we shall see, became convinced that he was in error as to the method of escape.

Baron Riedesel says, "General Arnold quietly hoisted anchor in the night and, sailing around the left wing, aided by a favorable wind, the American fleet escaped under cover of darkness." Baron Riedesel, however, was not with the British fleet at this time but had his account of the whole affair from General Phillips, a British officer. As General Phillips most certainly did not see the American movement, nor did any one else on the British vessels, his statement can hardly be considered reliable evidence. Admiral Mahan, in writing of this event, merely quotes Waterbury and Riedesel.

* Dr. Lossing was evidently in error here (see Arnold's report).

It will be noted, however, that Arnold makes no reference to a passage through the enemy's fleet, and it would seem that he would have referred to such an extraordinary event if it had occurred. With all Arnold's courage and audacity it seems hardly credible that he would attempt to pass through a line arranged as we have described, and run the risk of losing every vessel in his command. The British crews were composed of veteran British seamen, and the officers commanding them were selected for this special service. The vigilance of such crews would have been sleepless, and in such a tense situation British discipline would have been at its highest.

An American historian, Mr. Winslow C. Watson, in 1874, first elaborated a different theory of the escape. In an introduction to an essay by Mr. Watson on "A Naval Campaign on Lake Champlain," Dr. Lossing says: "Mr. Watson makes statements and advances theories well supported by facts and probabilities which indicate that hitherto historians have been in error in their account of the most important movements of the American fleet, namely, the method of their escape from Valcour Strait unperceived by the British."

Mr. Watson's version of the escape was as follows: "The general council of the officers decided that a retreat, however doubtful and precarious, should be attempted. For the accomplishment of this purpose, Arnold devised a maneuver as novel and sagacious in its conception as its execution was daring and immediately successful. He proposed to steal away from a watchful enemy almost within hailing distance, to pass around the northern point of Valcour, and by the advance he might obtain before the morning light revealed his movement, he hoped to escape pursuit and secure a refuge at Crown Point. In accordance with this decision at an early hour in the night, Colonel Wigglesworth in the galley *Trumbull* weighed anchor and led the van, followed in succession in a single line by the other vessels, the space between them being maintained as large as practicable, and each bearing a single light in the stern to guide the course of the one that followed. Arnold, in the *Congress,* mutilated and shattered in the conflict, closed the marvellous procession. . . . . The intense darkness of the night was deepened by a storm of sleet and rain."

Mr. Watson had his account from his father, Elkanah Watson, author of *Men and Times of the Revolution* and a prominent figure in the early history of New York State. The elder Watson was intimately acquainted with many of the officers who served under Arnold in this campaign. He had often heard them relate the manner of their escape, and how after passing around the northern point of Valcour, they made their way southward through the main channel of the lake and brought up in the morning at Schuyler's Island ten miles to the southward. With these men the circumstances of their escape were spoken of as well-established facts. Such a weird, picturesque incident, with the torn, disabled vessels creeping through the darkness and storm, must have made such a strong impression on their minds that they would hardly have forgotten any of its important details.

Another historian, Mr. Peter J. Palmer, of Plattsburg, in his *History of Lake Champlain,* corroborates this account of the escape. A family named Hay, who lived on the western shore of the lake, near where the engagement was fought, were spectators of the fight, and the traditions of their family confirm the statement that Arnold escaped with his fleet by passing around the northern point of Valcour.

The fact that two days later Arnold was to lose all his fleet but six of the smaller vessels, and over one hundred of his men prisoners to the British cannot dim the brilliancy of his intrepid achievement. The little fleet had maintained the mastery of the lake during the entire spring and summer of 1776, and until October, when the approach of winter put an end to all military operations and averted the danger of an immediate invasion. It held ten thousand British veterans and German mercenaries inactive and useless among the forts and camps of Canada, and shut up a large number of transports, intended to convey this force, which for many months floated in idleness in the Richelieu. Admiral Mahan sums up the campaign in these words, "The little American fleet on Champlain was wiped out, but never had any force big or small, lived to better purpose, or died more gloriously, for it saved the lake for that year."

From a painting by Charles R. Patterson

Courtesy Ralph H. Beaton, Esq.

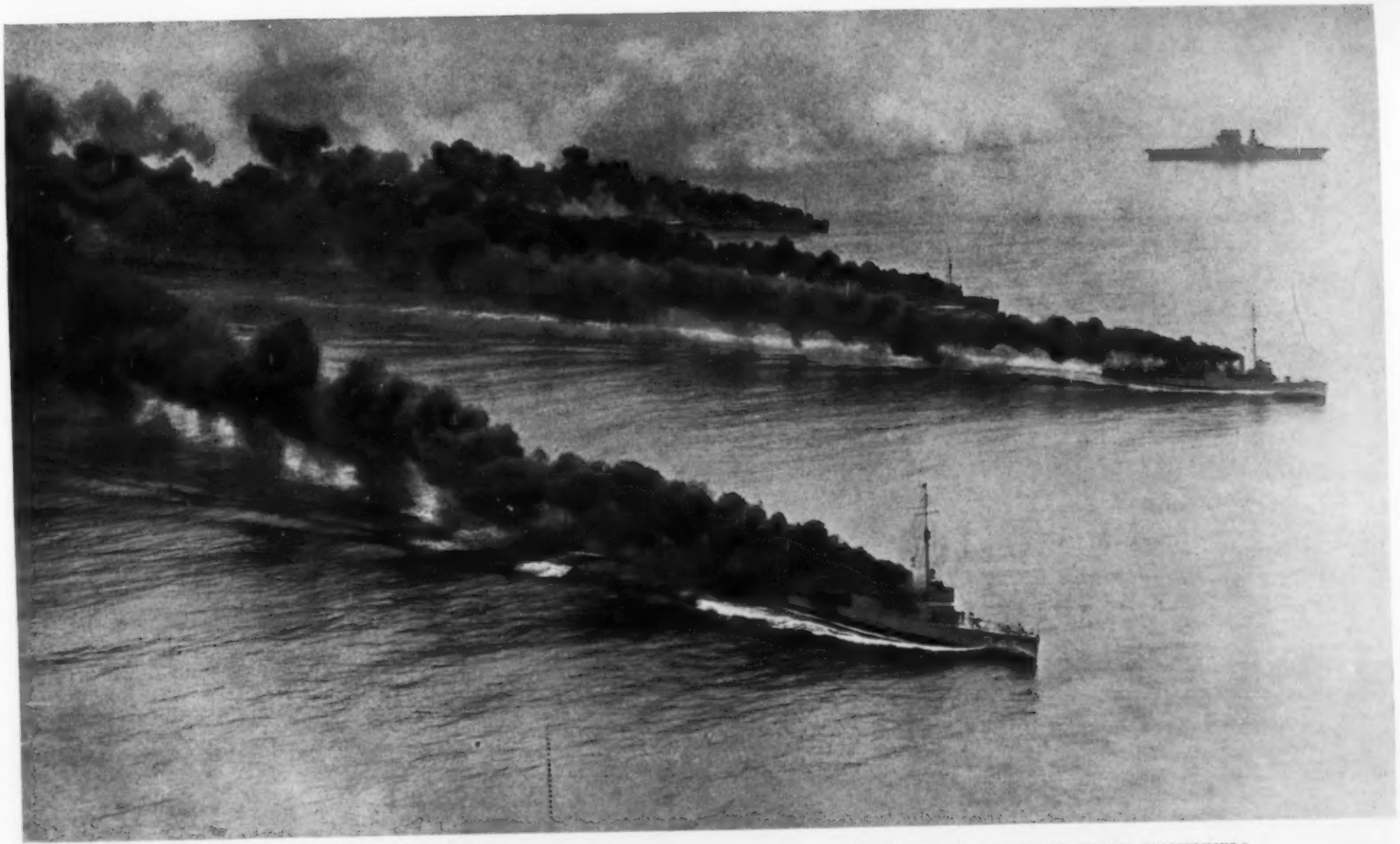
AMERICAN SHIP *ST. DAVID* AND BRITISH SHIP *KIRKCUDBRIGHTSHIRE*

Left San Francisco the same morning and arrived at Queenstown within thirty minutes of each other.

P. and A. Photo

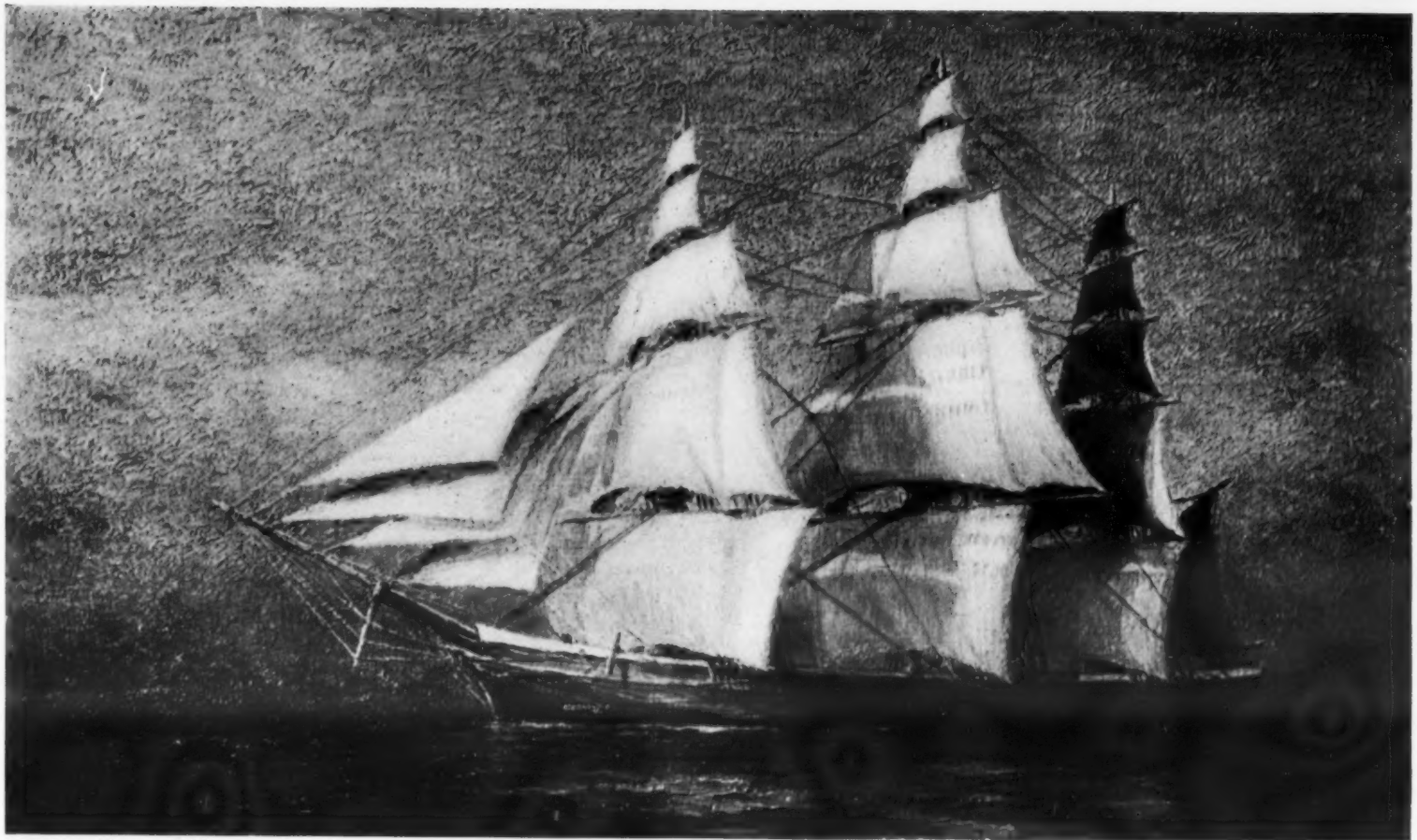
THE *DECATUR*, LEADER OF A DESTROYER SQUADRON

Coming through a smoke screen laid by airplanes, and laying a screen of her own. This is what makes life interesting in destroyers.



P. and A. Photo

AN AIRCRAFT CARRIER BEING SCREENED BY SMOKE FROM DESTROYERS AND AIRPLANES DURING FLEET MANEUVERS



From a painting by William Steeple Davis

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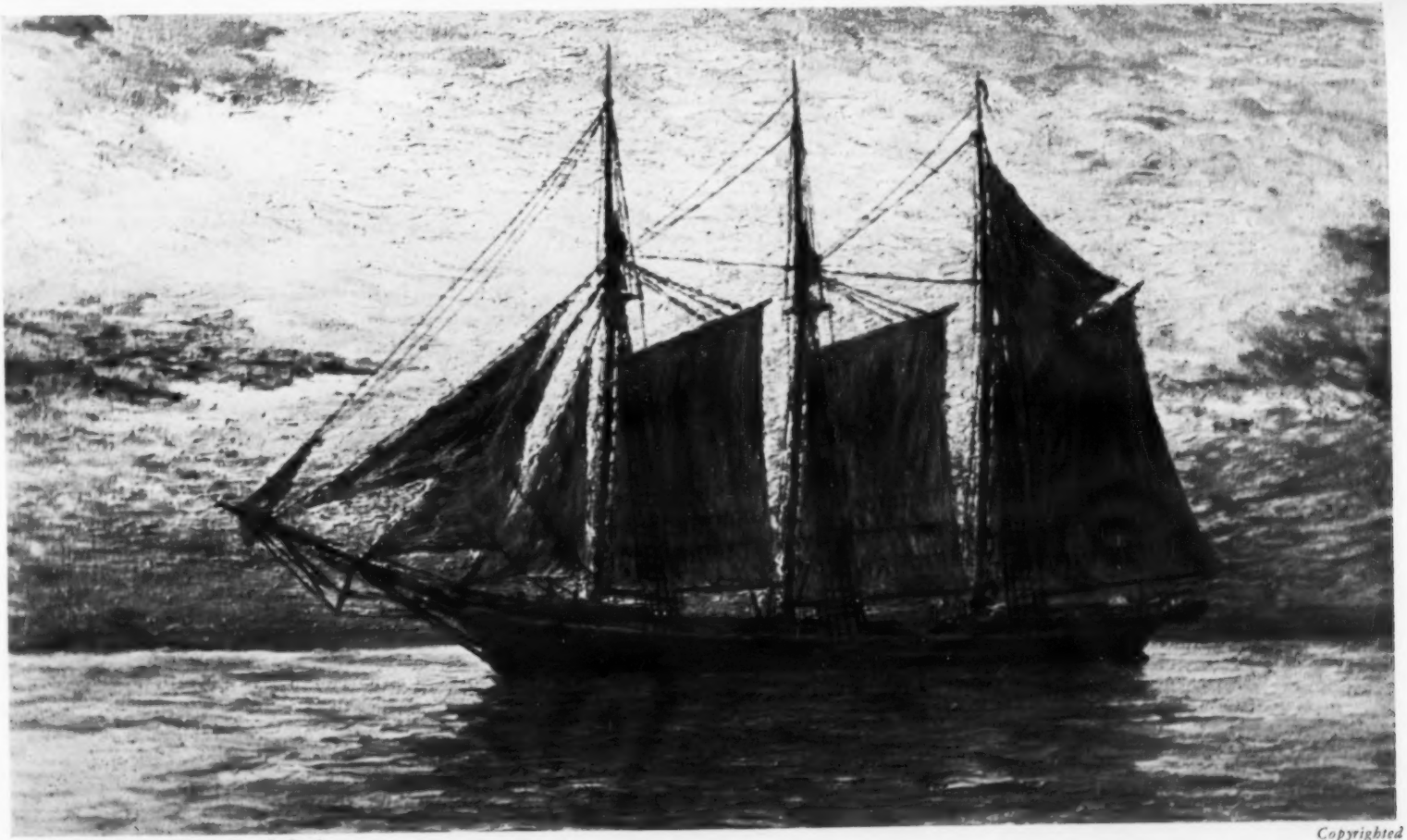
IN THE MORNING LIGHT

An old square-rigger with light sails set reflecting the glow of the morning sunshine.



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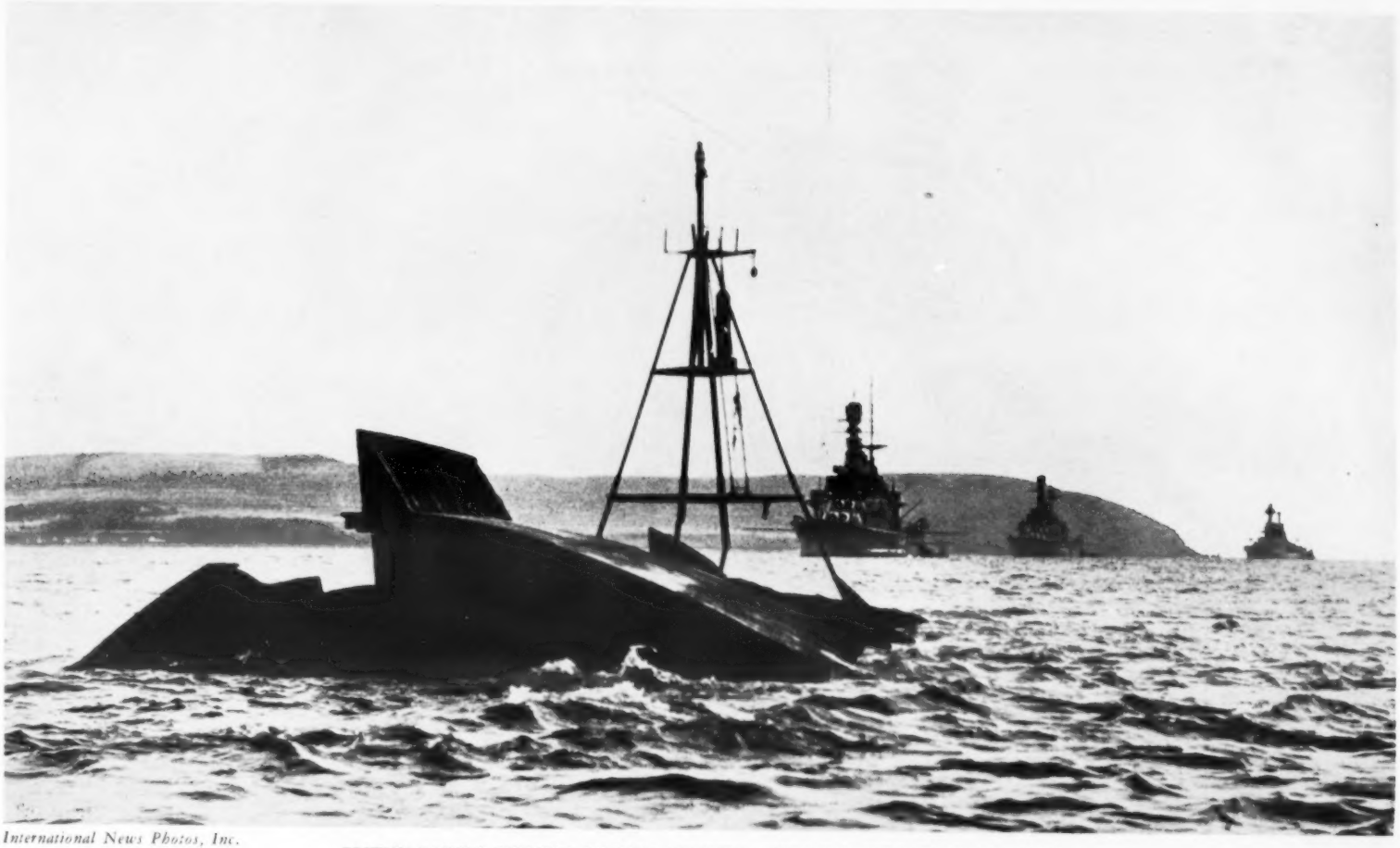
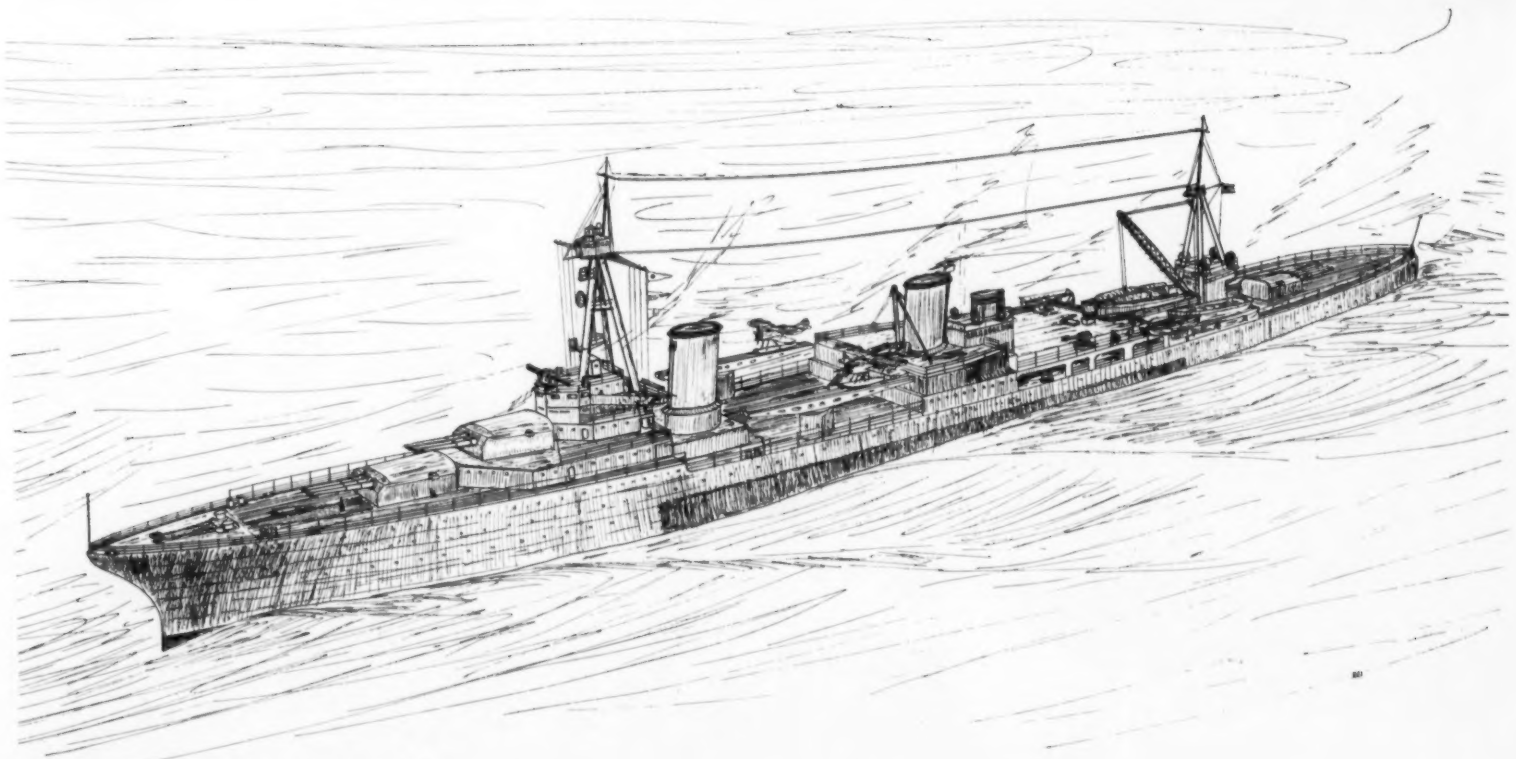
IN THE GLOAMING

A familiar type of coasting schooner commonly employed in the lumber and coal trades.



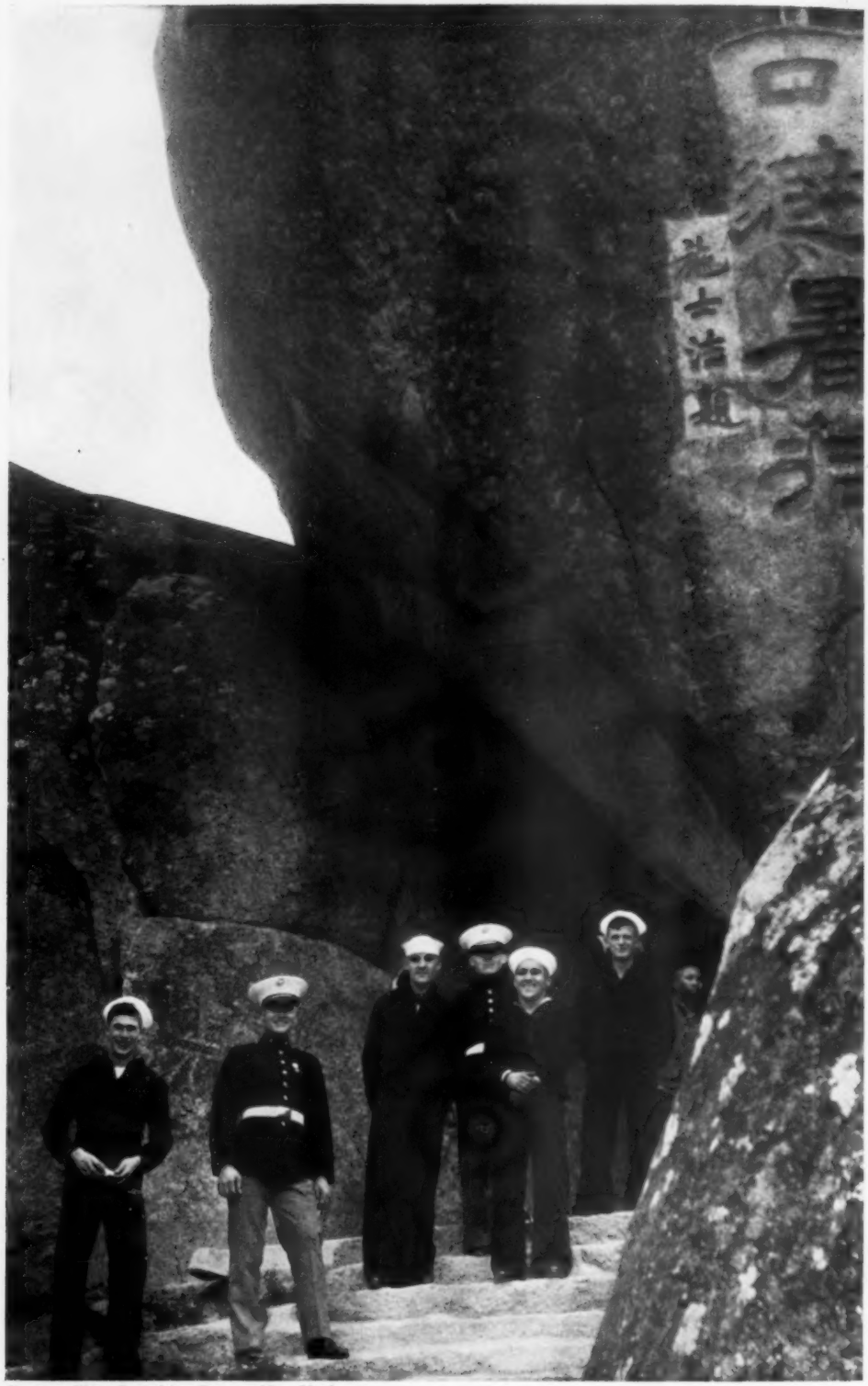
International News Photos, Inc.

BRITISH BATTLE CRUISERS *REPULSE, RENOWN,* AND *TIGER* AT CROMARTY FIRTH



Courtesy Lieutenant H. A. Ingram (C.C.) U. S. Navy

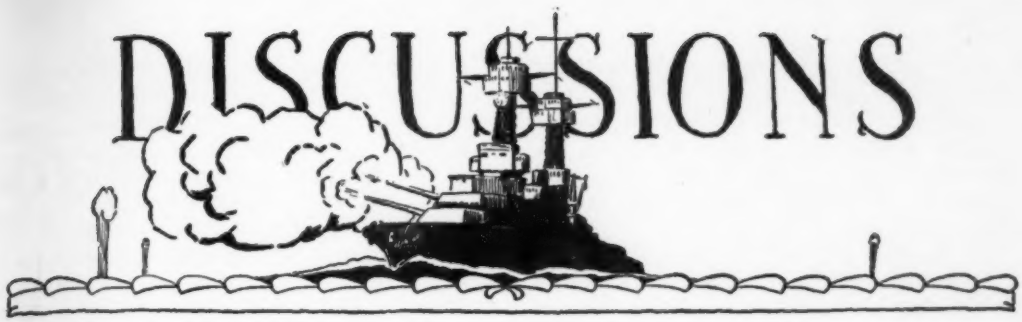
PEN SKETCH OF A 10,000-TON CRUISER OF THE *NORTHAMPTON* CLASS
Now building for the United States Navy.



Courtesy Navy Recruiting Bureau, New York

BLUEJACKETS FROM ASIATIC FLEET
On way to summit of Camel Hill, Amoy, China.

DISCUSSIONS



Training Reservists Aboard Destroyers

(See page 502, June, 1929, PROCEEDINGS)

LIEUTENANT G. F. FORSTER *(DE-F), U.S.N.R.*—When naval reservists break out their sea bags and bedding preparatory to embarking for the fifteen-day training period, it is believed that articles such as "Training Reservists Aboard Destroyers" are of more than passing interest. This interesting paper by Lieutenant Commander R. S. Field, U. S. Navy, has been the subject of a great deal of discussion at the dinners held by the Seventh Battalion, Naval Militia N.J. —U. S. Naval Reserve, each drill night on the U.S.S. *Newton*, Jersey City, N.J. The writer will endeavor to cover briefly those phases of reserve training brought out in the aforesaid article as well as other points worthy of consideration in advancing the efficiency of the Naval Reserve.

The writer, a graduate of the U. S. Naval Academy, served five years in the regular Navy, resigning in 1922 with the rank of lieutenant. Four of the five years were spent on destroyers, a year and a half as executive officer of the U.S.S. *Schenck* (159), an active fully manned destroyer attached to the Atlantic Fleet. Since 1923, he has been interested in naval reserve activities in New Jersey, and for the past four years as commanding officer of the Twenty-fifth Fleet Division, Seventh Battalion, U. S. Naval Reserve of Jersey City, N.J. As commanding officer of a division, he has noted that the most important problems in training a division are (1) getting the most benefit out of the sixty drills per year; (2) developing competent petty officers; (3) recruiting men whose civil occupations are such as to make them function well aboard ship; (4) reducing turnover of enlisted personnel; (5) training a sufficient number of men on board ship during the fifteen-day cruise to make the division of value as a nucleus of a destroyer crew.

The Seventh Battalion, Naval Militia of New Jersey, U. S. Naval Reserve, consists of the Twenty-fourth Fleet Division and Twenty-fifth Fleet Division as well as a headquarters division. Each fleet division consists of fifty-five class F-1 men who are paid for their drill attendance and forty-five class V-1 men who are not paid. The officer complement is five F-1 officers and, in certain cases, six. Officers of class V-1 are assigned at the discretion of the commandant of the naval district in which the unit is located. The class F-1 men, or fleet reserve as it is known, are the active part of the division and the class V-1, or volunteer reserve, a reserve from which men may be taken to fill vacancies in the fleet reserve. The mission of the fleet division is to man a destroyer in the event of mobilization. Since 1926 the annual cruises have been on board destroyers. This battalion has cruised on the following vessels:

1926—U.S.S. *Gilmer* (233); U.S.S. *Kane* (235).

1927—U.S.S. *Hatfield* (231); U.S.S. *Brooks* (232).

1928—U.S.S. *Lamson* (328); U.S.S. *Bruce* (329).

The greatest weakness of the plan of cruising on destroyers is the cruising allowance of but forty-five enlisted men. By reason of this not all of the paid class of enlisted men can cruise together. Many commanding officers have permitted the full fifty-five to report on board—this may be permitted by the commanding officer of the destroyer if he desires and is a great help to the reserve division. It is obvious that the division officer cannot cut ten enlisted men out of "the naval event in the peacetime life of the enlisted reservist" as Com-

mander Field aptly terms the cruise, without arousing a feeling of resentment in the men concerned. This in all probability results in many separating themselves from the service and detracts from morale. It should be remembered that the ten affected are an appreciable part of the division.

The present solution of this problem is to assign the excess men of one division to a division that is short of men. As no one can foretell how short a division may be until it reports for duty this solution is of no practical value. The men naturally want to be with their shipmates and feel they are not getting a square deal when shifted into a strange division. On account of the uncertainty as to whether the anticipated shortage will materialize, it is particularly difficult to arrange for leave of absence with employers. Employers generally do not want to derange their vacation schedules to permit a man to perform military duty if, through no fault of his own he may be left behind at the last moment. There is no question of lack of funds as sufficient money has always been available. It is the general opinion of reserve officers that the full strength of fifty-five class F-1 men and if possible five additional class V-1 men should cruise with their reserve unit and constitute the cruising allowance.

As the reserve units have developed greater discipline and ability through their association with the regular Navy, they have been permitted to furnish petty officers of the deck in port, petty officers for shore patrol, boat crews, and with non-rated men as mess-cooks and other appropriate details. A routine amount of chipping and painting would not be objectionable and would be in line with their training. Though the battalion from Jersey City has never experienced it, a few complaints have been heard that reserve divisions have been used as "labor battalions." It should be borne in mind that the enlisted men of the reserve are on two weeks' leave from their civilian employment which keeps them fully occupied during the other fifty weeks of the year. This should also be considered in planning their liberty. It would be of as great advantage to a division from the vicinity of New York to cruise to Bermuda or St. Thomas as it is to a southern or western division to get liberty in the harbor of New York.

The officers of the division which the writer has commanded for the past four years are as follows: one lieutenant, one lieutenant (junior grade), and one ensign, all Naval Academy graduates and qualified for deck and engineering duties, as well as one ensign, formerly a chief machinist, U. S. Navy, in charge of engineering repairs for scouting fleet destroyers, for engineering duty only, and one chief carpenter, who was formerly a warrant carpenter in the regular service. These officers are thirty-four years of age, twenty-six, twenty-six, forty-two, and forty-four, respectively and their ages are therefore not out of line with those of regular personnel. The question of officer replacement deserves attention as there are many officers whose services must be lost within the next five or ten years. The Twenty-fifth Fleet Division has two enlisted men attending the Third Naval District officer school as a step toward possible replacement.

The writer requested the comment of a battalion commander, not an Academy graduate, as to Naval Academy graduates in the reserve and it was substantially as follows: "Our organization has been fortunate in securing Academy graduates who have generally taken a deep interest in the work of the naval reserve. We have also secured officers from the enlisted personnel of the naval reserve who have, in the same degree, taken interest in the organization. Making good as a reserve officer is largely a question of stability of character and employment which permits giving the necessary time and effort to attend drills and cruises and which is backed by sufficient professional attainment to make the effort worth while." It is my own observation that most Naval Academy graduates in civil life do not dislike the service or show lack of interest in it but, on the contrary, they possess a lively and, often, an active interest in it and have its well-being and advancement at heart.

Each fleet division is allowed two chief petty officers, four first-class, six second-class, and eight third-class petty officers. Firemen first class are counted against the third-class petty officer quota. To develop an efficient engineer's force it would be well to allow each division a "bonus" of four firemen first class who would be in addition to the third-class petty officer allowance. Our petty officers have either had service in the

regular Navy or served an enlistment in the Naval Reserve. Those coming up from seaman and fireman ratings were developed by detailing them as "strikers" for their respective ratings over a period of from one to two years. The ability of the petty officers has been favorably commented on on both of the last two cruises and they have carried out their duties along with their regular shipmates to the satisfaction of all concerned.

The spirit of coöperation between regular and reserve that has marked our cruises has been of considerable help in getting the full measure of benefit out of the training period. There has been no petty hazing except as to newly enlisted seamen second class and firemen third class and this has been largely by reserve petty officers. In the Twenty-fifth Fleet Division all candidates for enlistment must be voted into the organization by the enlisted men of the division. A single adverse vote is sufficient to bar an applicant. A man having an honorable discharge from the regular Navy is considered to have been passed and accepted. Then, if in all respects qualified for enlistment by U. S. Navy standards, he is enlisted for four years in the U. S. Naval Reserve and the Naval Militia of N.J. During the past two years six men have applied for enlistment in the Navy, one in the Marine Corps, and one in the U. S. Coast Guard. All were accepted.

The activities of the Naval Reserve at drill during the year furnish the foundation for their active duty on the fifteen-day cruise. A division is allowed sixty drills at its home station during the year. These drills must be so planned that the interest of the personnel is aroused and maintained. A feature of the drill season on the home station is the visit of the Navy Department Board of Inspection, which occurs once each year. The board views the reservists at infantry drill, setting up drill under arms, emergency drills, the deck force at gun drill and the engineer force manning their stations. The various schools of instruction are seen and the methods used are commented on and desirable changes suggested. The board assigns marks to each division in (1) mobilization efficiency, (2) general appearance, (3) office work and records, (4) drills and class-room instruction. The division virtually assigns its own mark in the following: (5) average drill attendance, (6) percentage of division that cruised with the division, (7) inspection attendance, and (8) procurement. It is proposed that a penalty be assessed for excessive turn-over of personnel. The 150 reserve divisions are rated and given a standing for the fiscal year.

The typical evening drill routine which furnishes the bulk of the instruction for the division and brings it to a point where it can profitably take the fifteen-day cruise is as follows:

8:05 P.M. Officers' call, equip and assemble for muster.
8:10 P.M. Assembly followed by adjutant's call, roll call, and battalion assembly.
8:15 P.M. Drill call
Twenty-fourth Division—infantry, setting up exercises (with and without arms).
Twenty-fifth Division—gun drill on 4-inch 50-caliber gun and loading machine, safety precautions.
8:45 P.M. Drill call—
Twenty-fourth Division—gun drill, etc.
Twenty-fifth Division—infantry, setting up, etc.
9:15 P.M. Collision drill, fire drill, provide and abandon ship.
9:30-10:00 Class-room instruction.
10:05 P.M. Quarters for second muster.

The schools of instruction provide for the division of men into appropriate groups for instruction, which may be practical or theoretical, and which are conducted by a commissioned officer or chief petty officer. To provide for continuous and effective instruction it is absolutely necessary that the officers and chief petty officers detailed as instructors shall be regular and dependable in their drill attendance. The schools conducted in this battalion are as follows:

1. Engineers' school.
2. Deck force school.
3. Radio school.
4. Signalman and quartermaster school.
5. Gunner's mates school.
6. Yeoman school.
7. First-aid instruction by medical officer.

Proper armory facilities are essential as little inspiration or interest can be aroused by drilling under the handicap of poor sur-

roundings. If docking facilities are to be had, a floating armory is satisfactory. It can be fitted up with a drill shed, 4-inch gun, signal searchlights, blinker tubes, knotting and splicing board, an armory, office space, wardroom country, petty officers' quarters, and berth-deck quarters for the crew. The former Shipping Board ships are generally converted and already have ample facilities for training an engineer force. They are not, however, suitable for cruising and a vessel of the Eagle type has been found to be the most satisfactory for this purpose. It is available for week-end cruising and is in most essential characteristics a smaller destroyer. Its armament, small boats, living quarters, and enginering lay-out are so similar that training to perform the war-time mission can be carried out under the most favorable conditions. The Seventh Battalion cruises a greater number of days on the open sea on U.S.S. *Eagle 55* than it does on a destroyer during the fifteen-day cruise—more than the fifteen-day period, in fact. Some organizations have an outline of a destroyer painted on the armory floor and hold various exercises on this diagram. It is our experience that the enlisted men soon lose interest in such an artificial procedure and it is far better to hold, say, man-overboard drill aboard the *Eagle 55* alongside the dock and to supplement it by frequent drills on the week-end cruises off Sandy Hook under seagoing conditions.

It is believed that the efficiency of the U. S. Naval Reserve could be considerably enhanced if the same close coöperation existed between the Navy Department and the individual state militia offices (usually the office of the state adjutant general) as exists at present and has for some time past between the War Department and these offices. Little has been done along these lines, possibly due to constant rotation in office of regular officers assigned to reserve activities. This prevents, or seems to, the necessary personal touch and knowledge of conditions, which make desirable the personnel serving simultaneously as federal and state organizations. Today, many states which formerly maintained splendid organizations have allowed them to go out of existence. At the same time their national guards are better maintained, equipped, and housed than ever. As examples, the states of Maine, Massachusetts, and Pennsylvania have allowed their naval militia activities to cease. Ten states maintain naval militia divisions. These are fully as valuable to the state as the army outfits they maintain jointly with the U. S. Government. They are always available as police or in case of local disaster. The advantages of state service to the naval reserve are: (1) adequate armories can be secured; (2) naval regulations can be written into state laws placing the facilities and police power of the state behind a policy of proper discipline; (3) three days' additional active duty each year on state rifle range; (4) appropriations which supplement federal money for many purposes, notably for additional cruising; (5) state-owned docking facilities; (6) state aid and funds available for ceremonies throughout state instead of local duty only.

The foregoing lines have been written with the object of clarifying the all-year-'round problem of training and developing the Naval Reserve, as seen by officers actively associated with Naval Reserve divisions ever since the reorganization in 1925. While ships assigned to cruising the reserve no doubt go backward it is probable that this applies only to surface appearances and, slightly if at all, to essential operating condition. These ships carry divisions which would man approximately 140 destroyers in case of national emergency and it is certainly better to become aware through practical work-outs of any deficiencies in training and to correct them than to await a time of stress before so doing. It is felt that the reservists benefit greatly from their association with the regular personnel and each year progress more and more toward their objective of becoming a well-trained and balanced destroyer crew.

Seagoing Customs

(See page 11, January, 1929, Proceedings)

Lieutenant Commander Leonard Doughty, Jr., *U. S. Navy*.—The origin ascribed to the hand salute in this article, i.e., that it is derived from the custom of knights raising their visors for mutual recognition, is not only fictitious but harmful. This version has been circulated for some time in the Navy, even appearing in the *Bluejacket's Manual*, until it has become an accepted tradition, and has thereby robbed the salute of much of its significance and of its value

as part of the machinery of discipline.

It is even doubtful that any such custom as that described existed among knights. It is hard to imagine a knight plodding along a dusty road with his visor closed, only to open it on the approach of another knight. He would be more apt to keep it open until the approach of a potential enemy, or even to remove his helmet altogether, and put it on only upon approaching another knight. The heraldic device emblazoned on the shield served to make knights known to each other at a distance, and it is absurd to suppose that the small aperture of a visor opening would have enabled them to recognize each other at a distance to which no possible adversary would be permitted to approach unchallenged.

Even if we admit the authenticity of this custom, however, it is impossible to connect it with the salute. Such a gesture's only significance would be that of a friendly greeting between equals, and it is precisely this interpretation of the salute which has a pernicious effect on morale. It seems clear that the only possible origin of the hand salute is that it is a substitute for removing the hat, which latter custom was well established as an acknowledgement of subordination.

The P. Larousse *Dictionnaire du XIX Siècle* says, "At the time when the hat *rabattu a la Henri IV* was worn, politeness required that it be not removed. . . . . It is from this time that dates the habit of raising the hand to salute a superior." And: "The *ordonnance* of 1788 required that lower officers, to salute a superior, remove the hat holding it downward at the right side without inclining the head or body."

Further evidence is seen in the familiar fact that an orderly entering the captain's cabin aboard ship does not remove his hat as all others do, but being in a purely military status performs the military substitute for that formality by saluting.

Mahan, in his essay on Jervis, says: "He wisely believed in the value of forms, and was careful to employ them, in this crisis of the mutinies, to enforce the habit of reverence for the insignia of the state and the emblems of military authority. Young lieutenants—for there were *young* lieutenants in those days—were directed to stand cap in hand before their superiors, and not merely to touch their hats in a careless manner." And again: "To stand uncovered before a superior instead of lightly touching the hat, to pay outward reverence to the national flag, to salute the quarter-deck as the seat of authority, were no vain show under him." And finally ". . . . standing with his hat in his hand over his head, as was his lordship's invariable custom during the whole time that any person whatever, were his rank even a common seaman, addressed him on service. . . . ." His lordship apparently had ideas of his own on the origin of the salute.

The report was current at the time of the Russian revolution that the Soviet authorities in their mania for equality had abolished the salute, considering it a mark of servility, and that the morale and efficiency of their armies deteriorated markedly. Later the salute was restored and with it came a high degree of discipline and efficiency.

The career of Jervis and the experience of the Russians teach a lesson: the forms of military courtesy have a meaning and a value. If we allow them to be sugar-coated and euphemized out of all meaning, they will cease to have any value.

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LIEUTENANT COMMANDER D. C. RAMSEY, U. S. NAVY
AND
PROFESSOR HENRY BLUESTONE, U. S. NAVAL ACADEMY

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UNITED STATES

Navy Day

Washington *Post*, October 28.—Navy Day, October 27, has a special import to the people of the United States this year, and it is indeed appropriate that the seventy-first anniversary of the birth of Theodore Roosevelt should be observed throughout the Nation at the same time.

The Rooseveltian brand of peace, backed by the power of America to maintain it, represents an attitude of national defense and security preparedness which will never be willingly forsaken by the people of this country. The United States Navy stands as the chief reliance of the American people, and the main assurance against aggressions that provoke war.

There never has been a time in this Nation's history when the United States Navy meant more to the people than it does now. There has never been a time when more dangerous pacifist propaganda has been directed against the Navy by misguided dupes and cunning foreign internationalists, who are shrouding their operations in the white cloak of idealism and world peace.

The drive against American naval power is directly in line with the lessons which come down through the centuries. Sea power and commercial supremacy go hand in hand, and a weakening of one means the weakening of the other. America is rapidly rising to a position of commercial supremacy, despite all that foreign competitors can do to check her. A Navy adequate to protect and defend American commerce is the only agency that can maintain the United States in its righful position among the nations of the world.

America's colossal and ever-increasing economic energy is expressing itself in overseas trade, which means commercial supremacy. It is idle for any nation or nations to attempt to stem the tide. But every statesman who has not been blind to history knows that commercial supremacy is dependent upon naval protection. If America can be duped into abandoning protection for its commerce on the high seas, or can be tricked into pooling its naval resources with other powers, there may be a real opportunity in the near future for crippling the commerce that is enriching America and arousing the envy of foreign rivals.

"The fleet's the thing," according to one of Theodore Roosevelt's slogans, and it applies with more force than ever today. Americans are not ready to accept the humiliation of seeing the seas controlled by foreign powers so that America's commerce must beg for permission to venture off shore.

Adequate naval security means protection for American commerce, and this in turn means that the United States will not be forced into war to maintain its rights. The American negotiators at the London naval conference, if there should be a conference, must keep before them the faithful promise of President Hoover to the people, to the effect that the national defense shall not be impaired by any agreement bearing the signature of America's negotiators.

GREAT BRITAIN

Naval Reduction Conference

London *Times*, October 4.—Mr. Henderson, Secretary of State for Foreign Affairs, writing from the Foreign Office under date October 7 to General Dawes, the United States Ambassador, enclosed copies of the notes which he addressed that day to the French, Italian, and Japanese Ambassadors in London inviting the French, Italian, and Japanese Governments to participate in a Five-Power Conference to deal with the question of naval disarmament. Mr. Henderson added that he understood that the Government of the United States concurred in the terms of the Notes.

The following is a copy of the note addressed by Mr. Henderson to the French Ambassador:

I have the honor to inform Your Excellency that the informal conversations on the subject of naval disarmament which have been proceeding in London during the last three months between the Prime Minister and the Ambassador of the United States, have now reached a stage at which it is possible to say that there is no point outstanding of such serious importance as to prevent an agreement.

From time to time the Prime Minister has notified Your Excellency of the progress made in these discussions, and I now have the honor to state that provisional and informal agreement has been reached on the following principles:

1. The conversations have been one of the results of the Treaty for the Renunciation of War signed at Paris in 1928, which brought about a realignment of our national attitudes on the subject of security, in consequence of the provision that war should not be used as an instrument of national policy in the relations of nations one to another. Therefore, the Peace Pact has been regarded as the starting point of agreement.

2. It has been agreed to adopt the principle of parity in each of the several categories and that such parity shall be reached by December 31, 1936. Consultation between His Majesty's Government in the United Kingdom and His Majesty's Governments in the Dominions has taken place, and it is contemplated that the program of parity on the British side should be related to the naval forces of all parts of the Empire.

3. The question of battleship strength was also touched upon during the conversations, and it has been agreed in these conversations that subject to the assent of other signatory Powers it would be desirable to reconsider the battleship replacement programs provided for in the Washington Treaty of 1922, with the view of diminishing the amount of replacement construction implied under that Treaty.

4. Since both the Governments of the United States and His Majesty's Government in the United Kingdom adhere to the attitude that they have publicly adopted in regard to the desirability of securing the total abolition of the submarine, this matter hardly gave rise to discussion during the recent conversations. They recognize, however, that no final settlement on this subject can be reached except in conference with the other naval Powers.

In view of the scope of these discussions both Governments consider it most desirable that a conference should be summoned to consider the categories not covered by the Washington Treaty, and to arrange for and deal with the questions covered by the second paragraph of Article 21 of that Treaty. It is our earnest hope that the French Government will agree to the desirability of such a conference. His Majesty's Government in the United Kingdom and the Government of the United States are in accord that such a conference should be held in London at the beginning of the third week of January, 1930, and it is hoped that the French Government will be willing to appoint representatives to attend it.

A similar invitation is being addressed to the Governments of Italy, Japan, and the United States; and His Majesty's Governments in the Dominions are being asked to appoint representatives to take part in the conference. I should be grateful if your Excellency would cause the above invitation to be addressed to the French Government.

In the same way as the two Governments have kept your Excellency informally *au courant* of the recent discussions, so now his Majesty's Government will be willing, in the interval before the proposed conference, to continue informal conversations with your Excellency on any points which may require elucidation. The importance of reviewing the whole naval situation at an early date is so vital in the interests of general disarmament that I trust that your Excellency's Government will see their way to accept this invitation and that the date proposed will be agreeable to them. His Majesty's Government in the United Kingdom propose to communicate to you in due course their views as to the subjects which they think should be discussed at the conference, and will be glad to receive a corresponding communication from the French Government.

It is hoped that at this conference the principal Naval Powers may be successful in reaching agreement. I should like to emphasize that his Majesty's Government have discovered no inclination in any quarter to set up new machinery for dealing with the naval disarmament question; on the contrary, it is hoped that by this means a text can be elaborated which will facilitate the task of the League of Nations Preparatory Commission and of the subsequent Disarmament Conference.

FRANCE

France's Naval Rights

The Naval and Military Record, October 9.—By J. G. Gautreau.—America's untiring mothering of Europe in the question of disarmament continues to be watched here with keen interest, although in a somewhat disinterested spirit. The amiable straightforward discussion between American and English experts as to the respective needs of the world's two greatest fleets in the matter of cruisers leaves France altogether out of the bargain. Public sympathy goes to Britain, who depends on the sea for her daily life, while America is self-supporting. In truth, those never-ending squabbles as to size of weapons keep the world's attention focussed on war, which is a bad thing for international nerves. France does not mean to attack anybody, and therefore has no need to invite others to throw down their defensive weapons as being the only way to arrive at a fair and square understanding. But what France means this time is, without discussions, to stick to her defensive armament as framed by her own experts.

New Destroyers

The Naval and Military Record, October 9.—The *Brestois* class (*Brestois, Boulonnais, Basque,* and *Bordelais*), which is just entering the seagoing flotillas, possesses substantial qualities, marking an improvement on the *Simoun* and *Railleuse* series, namely, reduced top hamper, increased stability and seaworthiness, continuous sea speed, and economical fuel consumption. The last boats of that type, the "F" series (*Fougueux, Forban, Foudroyant,* and *Frondeur*), are getting ready and will all be available by the end of the present year, making up twenty-six torpeilleurs d'escadre that are unequalled in any Navy for combined speed and powers of offense. It was not intended to build any more vessels of that type, but since the Nantes-built *Fougueux* did thirty-six knots (in-

stead of the nominal thirty-three it looks as if that decision had been revised, and improved *Fougueux* are contemplated that are likely to have the following characteristics: 1,700 tons, 40,000 h.p. 38 knots, four or five 130-mil. weapons (the two foremost on twin mountings). The type having been successful and having been gradually improved, to give it up altogether would mean the total loss to the service of the valuable experience and experiments of the last four years, whereas the motto of the new Navy created by M. Leygues is homogeneity and continuity.

JAPAN

Program for Naval Revision

The Baltimore *Sun*, October 18.—Japan's appointment of so distinguished a civilian as Reijiro Wakatsuki, former Prime Minister, to be the head of her delegation to the coming naval conference at London is of considerable significance in that it indicates the state of mind in which she is approaching the matter. It shows that Japan takes the London parley very seriously.

She realizes, no doubt, that should London repeat the failure of Washington and Geneva in limiting auxiliary ships, especially cruisers, neither the White House nor Downing Street would probably for a long time renew the effort to come to a naval understanding, thus reviving a building competition between the two major sea powers which would inevitably produce an embarrassing effect upon Japan's own naval program.

Japan has much to gain from a reasonable naval limitation as between England and the United States and much to lose from nonlimitation. By intrusting her naval mission to a civilian statesman of Wakatsuki's caliber, she hopes to contribute materially toward the much-hoped-for agreement.

The appointment of Admiral Takarabe, Minister of the Navy, to the second place on the mission may prove an advantage rather than a disadvantage for much the same reason that Admiral Kato's leadership expedited Japan's actions and decisions at the Washington Conference, for no civilian leadership, without the coöperation of an outstanding naval authority, can effectively conduct international negotiations on the problems of maritime defense.

That Japan is solicitous of Anglo-American agreement does not mean that she is ready to subscribe without modification to any understanding which may have been arrived at between President Hoover and Premier MacDonald. She has her own naval requirements, and any agreement between England and the United States which ignores those requirements is not likely to meet with her ready indorsement.

What, then, is the plan which Japan is likely to advance at the conference? Although no official pronouncement has been made on this question, enough has been reported in the press, both Japanese and foreign, to justify the assumption that the essential features of the Japanese program at the conference will be as follows:

1. Japan is favorably inclined to the abolition of battleships. Pending their abolition she will support postponement of building for replacement, which, under the Washington treaty, is to commence in November, 1931. She also will support extension of replacement age and limitation of the maximum tonnage of individual battleships to something between 25,000 and 30,000 tons.

2. Japan wants her cruiser ratio fixed at seven, as compared with America's and England's ten, especially with reference to 8-inch gun cruisers. At the same time she is in favor of limiting the maximum size of cruisers to something like 8,000 tons.

3. She hopes that the total cruiser tonnages agreed upon between President Hoover and Premier MacDonald—340,000 tons for England and 300,500 tons for America—will be somewhat scaled down so that she will not, in the event of the adoption of 10-10-7 ratio, be obliged to increase her building plan now in effect.

4. Japan is opposed to the abolition of submarines and will probably insist upon maintaining her existing strength, which is about 70,000 tons, but thinks that the size of submarines should be limited so as to make them entirely a defensive weapon.

5. In destroyers Japan will want to maintain her existing strength, which is about 90,000 tons.

TURKEY

The Navy of Today

London *Times*, October 14.—The Republican Government of Turkey has not spent much money on the Navy, as its chief preoccupation has been to reorganize and reequip the Army. For administrative pur-

poses the Navy comes under the Ministry of National Defense, in which there is an Under-Secretary for the Navy, but the Naval Staff is subordinated to the General Staff. The 1929 Budget estimates only included £T6,000,000 (£600,000) for the Navy, but in 1928 £T25,000,000 (£2,500,000) was authorized for new construction and repairs to existing craft. The expenditure of this sum is to be spread over ten years. The personnel of the Turkish Navy consists of 800 officers and 4,000 men. Only one Admiral, Vassif Pasha, who is President of the Straits Commission, is on the Active List.

The *Yavuz Sultan Selim,* formerly the *Goeben,* which has lately undergone a refit in the floating dock near Ismid, and is again afloat, is by far the most important unit in the Turkish Navy. She is a battle-cruiser dating from 1911, and is, therefore, obsolete in comparison with foreign vessels of the same size. Nevertheless, the Turkish Government decided to reconstruct her, and she has been undergoing a thorough refit in a floating dock bought in Germany. This refit was carried out by a group, so it is stated, of five French shipbuilders. Ismid, where the floating dock is situated, is now the Turkish naval base. Experts believe that the battle-cruiser will be capable of a speed of twenty-five knots as a result of the refit, which is equal to her original designed speed. When the *Yavuz* is at sea again—she is expected to be ready by January, next—she should be more powerful and capable of a higher speed than any of the warships belonging to neighboring countries.

With the exception of two small submarines, 450 tons each, built in Holland in 1928, the remainder of the Turkish fleet consists of a number of old, and almost obsolete, vessels. The *Hamidieh* and *Mejidieh* are both twenty-five-year-old light cruisers, and the five small torpedo-boats and the nine gunboats are all in poor condition and of little fighting value. Turkey has, however, recently placed an order with Italy for two destroyers of 1,600 tons each, to be capable of steaming thirty-eight knots, one mine-laying submarine of 800 tons, one submarine of 600 tons, and three fast motor-boats which are designed as submarine chasers. These craft are to be delivered by the end of 1931, and it is understood that on account of Government assistance the Italians have agreed to very easy terms of payment. The order was secured in the teeth of keen British and French competition, and the easy payment facilities were probably responsible for the Italian success.

Naval Training

The Turkish Government is planning to build a new naval base on the southern shores of the Gulf of Ismid; a seaplane base already exists at Smyrna. The Naval Air Force, which is not under the control of the Fleet, possesses twelve or more Savoia and Rohrbach flying-boats, and it is likely that this number will be increased. Efforts have been made in recent years to improve the discipline and efficiency of the force. German naval mechanics give courses of instruction at Ismid, and although the material is somewhat poor, the general tone is good.

Before the War a British Naval Mission, under Rear-Admiral Limpus, was stationed at Constantinople. During the War Turkey swarmed with German naval experts, who, of course, disappeared after the Armistice in 1918. A German Naval Mission, under Vice-Admiral (retired) Gagern, has, however, been in Turkey since 1926. This mission consists of four Commanders and some petty officers and has no executive control. Two Turkish naval officers are afloat with the Italian Navy and two more are learning in England and France respectively.

GREECE

New Destroyers

The *Engineer,* October 11.—Those who took part in the recent Summer Meeting of the Institution of Naval Architects in Italy, and who saw the remarkable activity in the well-equipped shipyards of that country, will not be surprised by the news that the Genoa firm of N. Odero and Company has been successful in securing the order for two destroyer leaders for the Greek Government, at a price much below that of other competitors. The price of the ships is given as £255,000 each, if the four Dardo type 12 cm. guns are placed singly, or £246,000 if they are placed in pairs as in the Italian destroyers. The tenders included offers from six British firms, three French yards, and three Italian yards, and it is understood that the British prices were on an average about £50,000 more than the tender which was accepted. The new vessels are to have a length

of 92.35 meters, or about 303 feet, with a beam of 9.2 meters, or a little over 30 feet, and a draught of 3.31 meters or about 10 feet 10 inches. The displacement will be 1,450 tons and the maximum speed 40 knots, with a trial speed over four hours at 39.5 knots, and an economic cruising speed of 20 knots. The propelling machinery will consist of three water-tube boilers and two Parsons type turbines, and the armament will include four 12-cm. guns, three 40-mm. anti-aircraft guns and six 53-cm. torpedo tubes. The first ship is to be delivered in twenty months, and the second about two months after. The decision with regard to the placing of the guns referred to above will be made in about ten days. The Minister of Marine in Athens states that these vessels are required to complete the renewal of that country's small navy, and that they will embody the latest developments in destroyer design.

ENGINEERING AND RADIO

Westinghouse Low Bidder on Cruiser Turbines

Marine Journal, October.—Bids were recently opened for new geared cruiser turbines, new geared H. P. turbins, and Kingsbury propeller thrust bearings, for the battleships *Pennsylvania* and *Arizona*. A digest of the bids submitted on this job follows:

Westinghouse Electric and Mfg. Co., $518,000; delivery ten months.

Newport News S.B. & D.D. Co., $680,000; delivery ten to thirteen months.

Bethlehem Shipbuilding Corporation, $691,630; delivery eleven to fourteen months.

New York Shipbuilding Corporation, $853,000; delivery twelve months.

The award has been made to the Westinghouse company for the complete new equipment for both ships. The U.S.S. *Pennsylvania* will be reconditioned at Philadelphia, while the U.S.S. *Arizona* will be refitted at the Norfolk Navy Yard, Norfolk, Virginia.

Auxiliary Turbo-Electric Drives Aboard Ship

The Engineer, October 18.—An interesting method of utilizing the energy in the exhaust steam from a marine reciprocating engine is to allow such steam to produce electric current in an exhaust turbine generator set and to use the current to provide additional propelling power in a motor arranged on a section of the tail shaft. Towards the end of last week sea trials were carried out with an installation of this kind which has been developed by the Metropolitan-Vickers Electrical Company, Ltd., in conjunction with Mr. W. Hinchcliffe, the superintendent engineer of Ellerman Lines, Ltd., and has been applied on the steamer the *City of Hong Kong*. The necessary alterations to the propelling machinery were made by Workman, Clark (1928), Ltd., at Belfast. Very complete trials were carried out, including a series of full-speed and slow-speed reversals of the reciprocating engine and the electrical machinery simultaneously. It was shown that even at reduced engine powers a large auxiliary turbine output was still obtainable, while the flexibility of the larger installation of similar machinery is now approaching completion on the P. and O. liner *Mooltan*, a passenger steamer of over 20,000 gross tons, with quadruple-expansion engines of 15,000 I.H.P. The order for the conversion of this ship was placed nearly a year ago with the British Thomson-Houston Company, Ltd., of Rugby, which has collaborated with Mr. R. T. Clarke, the owners' chief superintending engineer, in the carrying out of the scheme. The work of installing the new electrical plant is being done by R. and H. Green and Silley, Weir, Ltd., of London. It is expected that the *Mooltan* will be ready for her trials in the early part of next month.

RCA To Establish Radio Schools Over Country

Nautical Gazette, September 28.—Announcement was made this week of the formation of the RCA Institutes, Inc., a subsidiary of the Radio Corporation of America, for the purpose of establishing radio schools in various cities, throughout the country to meet the steadily increasing demand for trained radio men. The new organization is the successor to the Radio Institute of America, formerly the Marconi Institute, founded in 1909, and the oldest commercial radio school in existence.

Expert operators for marine and air services, radio technicians, service men and mechanics are required in ever increasing numbers. The headquarters and main school will be at 326 Broadway, New York. The new organization has also acquired the Philadelphia School of Wireless, founded in 1911,

and the Eastern Radio Institute of Boston, founded in 1913. In addition to the schools in New York, Boston and Philadelphia, new schools will be established in the near future in Newark and Baltimore, to be followed by others as rapidly as possible until resident schools exist in every principal center of the country. The resident schools will not only serve for students desiring to attend regular classes, but will also be available for postgraduate work by correspondence course students who, until now, have found it impracticable to come to the New York classes.

Although much of the training takes the form of correspondence courses for radio operators and technicians, elaborate equipment will be maintained at the various schools, for regular classes and for postgraduate work. This equipment includes receiving and transmitting apparatus, laboratories and code practice class rooms to provide students with first-hand experience with practical radio equipment and methods.

According to Mr. Duncan, president and director, RCA Institutes, Inc., comes at an opportune time. "Until now," he said, "our facilities have been so heavily taxed that we have been unable to graduate a sufficient number of trained radio operators and radio technicians to meet the increasing demands of radio communication, broadcasting, manufacturing and distributing organizations."

Navy Will Test Radio Stations Of Reservists

The Baltimore *Sun*, October 13.—The office of United States Naval Communications today announced the establishment of a "radio central," through which the navy will make tests twice a week of a network of stations operated by naval reservists, all amateurs. This will make available a reserve radio service for volunteer work in disasters.

During the recent hurricane in the Gulf States radio stations owned and operated by members of the Naval Communications Reserve were of material aid to the United States Weather Bureau and the press. The radio central will check Monday and Thursday nights from 7:30 to 10.

MERCHANT MARINE

The Pennsylvania

The Nautical Gazette, October 19.—Built by the Newport News Shipbuilding & Dry Dock Company, the 33,375-ton turbo-electric liner *Pennsylvania*, the largest merchantman ever built in America, arrived at New York, October 13, from Newport News, Va., and sails on her maiden voyage to San Francisco via the Panama Canal today, October 19.

She is not alone the greatest American-built steamship, but the world's biggest commercial vessel propelled by turbo-electric drive.

Under the critical observation of maritime and shipbuilding experts the *Pennsylvania* was put through an exacting test on her 12-hour sea trial off the Virginia Capes October 3, surpassing in every detail the rigid performance planned for her.

Knowing her construction to be the last word in the art of shipbuilding, Homer L. Ferguson, president of the Newport News Shipbuilding & Dry Dock Company, on delivering the *Pennsylvania* to the Panama Pacific Line October 12 said: "Gentlemen, I am transferring to you, today, the greatest merchant vessel ever built in America—the perfect ship."

The new *Pennsylvania* is 613 feet long, has a beam of 80 feet, a displacement of 33,375 tons and a depth of 100 feet from upper deck to keel. In her luxuriously furnished staterooms, all outside rooms, she will have accommodations for 800 passengers, equally divided between first and tourist cabins, while her enormous cargo holds will have a maximum capacity for 10,000 tons of perishable and semi-perishable cargo. At an average speed of eighteen knots the great liner, without being pushed, will make the 5,000-mile journey from coast to coast in thirteen days.

Extension of Coastwise Laws to Philippines Sought

The Nautical Gazette, October 19.—Extension of the coastwise shipping laws to embrace trade to the Philippine Islands, to be taken under advisement and investigation by a sub-committee of the Senate Committee on Commerce, has been proposed in a resolution introduced by Senator Vandenberg, of Michigan, and the possibility of such an extension is creating a stir of interest in shipping circles.

The sub-committee appointed to determine the advisability of such an extension consists of Senator Johnson, of California, who will serve as chairman; Senator Vandenberg,

of Michigan; Senator Fletcher, of Florida; Senator Ransdell, of Louisiana, and Senator Patterson, of Missouri.

Extension of the coastwise shipping laws, in accordance with Section 21 of the Merchant Marine Act of 1920, would mean that all products coming to the United States from the Philippine Islands would be shipped in American bottoms. This would eliminate foreign-flag services from the trade and would minimize competition against American producers. American lines cannot transport at rates as low as those of foreign lines, so it is argued that the presence of the foreign lines tends to keep freight rates at a low level and American producers find a serious handicap in the heavy importation from the Islands. And if the foreign lines were eliminated it was thought that American lines would advance rates which would militate against Philippine competitors of American producers by forcing up the C. I. F. prices of Philippine products.

A proposal for the exension of the coastwise law was advanced by the Shipping board in 1922, but the recommendation did not come to fruition, and the matter has since found vigorous opposition from interests in the Islands.

There are at present nine American steamship lines operating in the Manila trade which would be favorably affected by extension of the coastwise law and nine foreign-flag services which the trade restriction measure would touch.

With American services gaining a monopoly on trade, the matter of exorbitant rates prevailing was advanced in connection with the proposed extension of the coastwise law in 1922, but it has been pointed out that the Shipping Board is empowered to order steamship companies to discontinue charging or collecting rates which are deemed unjustly discriminatory between shippers or ports or prejudicial to American exporters.

Open hearings on the question began in Washington, October 18, and the first witnesses to be heard by the sub-committee were T. V. O'Connor, chairman of the Shipping Board, and John Nicolson, the Board's legislative representative.

This matter touches upon the question of the independence of the Philippines, which is to come up before Congress in the December session.

AVIATION

New Barrel Type Aero Engine

The New York *Times*, October 6.—Interest has been manifested in England in a new barrel engine designed by K. K. Turner, an Australian war pilot, and shown privately to the trade. This type of motor has many advantages over the ordinary types of internal combustion engines, especially for high horsepowers, on account of the absorption of much waste energy and its small frontal area.

In principle it is a motor of great simplicity. According to the description given in the engineering supplement of *The Aeroplane*, the barrel engine divides conveniently into three principal parts: the gearing in the hub part of the casing, the oscillating member with its pistons, and the cylinder block at the rear end.

The cylinder part of the engine operates on the reciprocating system of ordinary internal combustion motors, except that its cylinders are arranged in a circle instead of in line or in pairs. There are six cylinders in the model shown. The downward thrust of the piston causes the oscillating member to turn and the oscillating member, geared at five to one (2,500 piston cycles a minute to 500 shaft revolutions a minute) to the hub gearing, turns the propeller shaft.

The following advantages are claimed for this type of engine:

As all surfaces are in rolling contact, there is a minimum of friction and a maximum freedom from lubrication difficulties.

The gearing can be changed readily to suit the airscrew and the engine revolutions thus made to harmonize with the airscrew requirements.

In shape it is almost streamlined.

It may be cooled by air, fluid or water.

There are no parts that require hand fitting.

Easy to assemble and dissemble.

Has a good horsepower ratio to weight on account of being a high-speed engine.

It is able to rotate the airscrew hub at its most efficient speed by virtue of direct tractive effort.

Freedom from side thrusts and other frictional loss of energy.

Cheap to produce.

Such an engine might be called an internal rotary type. Most old pilots remem-

ber their troubles with the old rotary types. One was the tremendous gyroscopic action they attained at high speeds. It is probable that some of this effect would be noticed in the barrel engine, with the additional objection, as the English discussion points out, of the centrifugal force throwing the pistons against the cylinder walls and thereby causing odd thrusts and strains.

The Guggenheim Fund Safety Competition Tests

The Baltimore *Sun*, October 13.—There are nine tests provided by the competition, with which the successful planes must comply. In making the tests the planes are first flown by the manufacturer's pilot, and then by a pilot selected by the directors of the competition. The nine tests are:

1. The aircraft must maintain level and controlled flight at a speed not greater than thirty-five miles per hour, and be able to glide for three minutes with all power switched off and at a speed not to exceed thirty-eight miles per hour.

2. A steady glide must be made over an obstruction thirty-five feet high and the aircraft must come to a complete stop within 300 feet of the base of the obstruction. This is to test the ship's ability to make a forced landing in a small space surrounded by wires, houses or trees.

3. The aircraft must come to a complete stop within 100 feet of the spot where it first touches the ground in landing.

4. The aircraft must take off after not more than a 300-foot start along the ground, and then must clear a thirty-five foot high obstruction 500 feet from the starting point.

5. To test its ability to approach an uncertain landing place in the event of engine failure, the aircraft, with all power switched off, must glide at an angle of not more than eight degrees to the horizon and must also be able to glide at an angle of not more than sixteen degrees to the horizon at a speed not greater than forty-five miles per hour.

6. In normal flight, at a speed of from 45 to 100 miles per hour, the pilot must take both hands off the controls, leaving them entirely free for at least five minutes to demonstrate the ability of his craft to right itself after disturbances from wind gusts or from the application of controls.

7. The aircraft must show that if the engine suddenly fails on a steep climb, no abnormal attitude such as a stall followed by a nose dive will result, and that the craft will descend on a steady, easy glide without intervention by the pilot. A frequent error following engine failure is the pilot's tendency to pull back on his controls instead of nosing down his craft into a glide. The aircraft must demonstrate that it is foolproof against such an error, and one of the tests requires that the power shall be switched off on the climb, the elevator control pulled back toward its maximum extent, and the craft shall, under such conditions, descend on a steep glide at a speed of not more than 40 miles per hour, and under perfect control.

8. The ship must be provided with three controls, independently effective, about corresponding axes of the aircraft at all attitudes.

9. The aircraft must show its ability to take off and land on a plot 500 feet square surrounded by a twenty-five foot obstruction. To test this properly a portion of the field will be marked off and four observers placed twenty-five feet above the ground will sight across the borders of the plot. After the craft has left the ground the observer in the plane will switch off the engine when he pleases and the pilot will land the craft within the required square without passing through the imaginary obstruction. The test will demonstrate the ability of the craft to use restricted territory with bad approaches. The aircraft must be able to taxi under its own power in any direction in a wind whose mean speed is at least twenty miles per hour.

The U. S. Army Tests at Aberdeen

The New York *Herald-Tribune*, October 20.—Each year through the efforts of the Army Ordnance Association an annual review of the Army's ordnance work is staged at the Aberdeen Proving Ground in Maryland, which affords the opportunity for measuring progress in the development of war machines.

The 1929 meeting, held the second week in October, was featured by the participation of aircraft on a scale heretofore unknown at these annual, picturesque displays of gunfire. The National Aeronautic Association was invited to co-operate and the Army Air Corps sent fleets of pursuit, attack and bombing planes.

For several years the ordnance meeting

had indicated that the war machines of the ground progressively were attaining greater and greater speed. The presence of aircraft in the display this year was especially welcome as affording a reliable yardstick for a comparative measuring of this speed and accuracy.

Mobile mechanical units raced over rough terrain. A special light tractor tank capable of a speed of seventy miles an hour performed on the proving ground. Whole batteries of electrically timed guns sprayed the skies with real bullets. The artillery, working with the best equipment which ordnance men could provide, sent word that it was ready to prove what it could do against long sleeve targets to be towed across the sky by the Air Corps men.

The Army planes came, towing the requested targets. Back and forth through the range of the electrically timed batteries they flew. First the machine guns barked. Then the larger anti-aircraft guns roared. When all the shooting was over one of the Army pilots dropped to a low altitude where he flew back and forth flaunting an untouched red sleeve target in the faces of the artillery men.

The climax and the high light of the artillery show was the firing of one round from a 16-inch gun, on the barbette carriage. This 16-inch gun is the largest weapon constructed for seacoast defense in the country. The maximum range with a charge of 702 pounds of powder is about thirty miles. The projectile weighs 2,100 pounds. One shot was fired in the display.

But earlier in the afternoon two Curtiss Condor bombers flew over the proving ground and dropped two 4,000-pound demolition bombs, which, if weight alone is to be considered, must be conceded as capable of doing twice the damage of the gun-fired shot.

The comparative accuracy of the two methods must be left for "long range" argument between the aircraft men and the artillery. Only one additional fact need be stressed. The range of this largest of coast defense guns is thirty miles. The range of the Condor is 500 miles.

It has been assumed, but it is an erroneous assumption, that the annual meet at Aberdeen is the resumption of the argument of aircraft vs. anti-aircraft between the Army Air Corps and the Ordnance Department. This is wrong. The argument is solely between the Army flyers and the artillery-men.

The rise of the airplane to a position of first importance as a war machine has brought only additional work and a whole new series of problems for the ordnance men. They are required both to make the airplane an effective machine of destruction through the provision of guns and aerial bombs, and also to render it wholly vulnerable by the development of anti-aircraft.

THE CURTISS F7C-1 SINGLE SEAT FIGHTER

Navy Planes of Recent Design

The Aeroplane, October 2.—The Curtiss F7C-1 is a single-seat ship-board fighter, fitted with the 425 h.p. Pratt and Whitney Wasp engine. It differs in many features from the standard "Hawk," particularly with regard to arrangement of wings, undercarriage and general equipment.

Type.—Single-seat naval ship-board fighter.

Wings.—Unequal span staggered biplane. Top planes have 7 degrees of sweepback outside the center-section. Bottom planes are straight. Center-section is mounted above fuselage on widely-splayed "N" type steel-tube struts. One pair of splayed "N" type steel-tube interplane struts on either side of fuselage. Ailerons on inset hinges on top planes only. Wings of Curtiss C-72 section, of wooden construction, with spruce box-spars and ribs, covered with fabric.

Fuselage.—Constructed of riveted steel and duralumin tubing, with steel fittings, and is designed for catapult and deck-landing loads.

Tail Unit.—Normal type. Metal-framed, covered with fabric. Balanced rudder. Adjustable tail-plane.

Undercarriage.—Split type. Consists of two Vees hinged to bottom fuselage longerons and two half-axles hinged to a Vee cabane under fuselage. The shock-absorbing medium in front legs of Vees is a combination of a two-cylinder oleo gear and rubber discs. Hydraulically operated wheel brake-shoes bear on the inner surface of the wheel rims. Entire undercarriage may be replaced by a single central float and two wing-tip floats, and the machine can be catapulted with either type of landing gear.

Power Plant.—One 425 h.p. Pratt and Whitney Wasp air-cooled radial engine. Main petrol tank, carried in fuselage, is fitted with dumping valve, to lighten machine and provide extra buoyancy in event of forced landing in the sea.

Accommodation.—Pilot's cockpit in rear of trailing-edge of top plane. Pilot's seat is provided with 11-inches up-and-down adjustment, and rudder pedals slide back and forth in conjunction with sea. In turtle-deck, behind cockpit, is carried a pneumatic life-raft which can be inflated in a few seconds with carbon dioxide. All petrol pipe lines kept outside pilot's cockpit and pressure fire-extinguisher carried in engine compartment.

THE CURTIS XF8C-2 EXPERIMENTAL TWO SEAT FIGHTER

The Curtiss XF8C-2 is an experimental two-seater ship-board fighter equipped with a 450 h.p. Pratt and Whitney Wasp engine. Though resembling the Curtiss Falcon in appearance, it possesses many of the characteristics of the lighter, single-seater fighters.

Type.—Two-seater ship-board fighter.

Wings.—Equal-span, staggered biplane. Upper wing has 12 degrees of sweep-back. Bottom wings are straight. Center-section is mounted above fuselage on widely-splayed "N" type duralumin tube struts. Interplane bracing consists of one pair of "N" type struts in either side of fuselage. Wings are of wooden construction, employing C-72 airfoil section, with spruce box-spars, wood

ribs, and fabric covering. Wing-bracing consists of double flying wires and single landing wires. Lower ailerons are balanced.

Fuselage.—Constructed of steel and duralumin tubing, with Warren-truss bracing.

Tail Unit.—Normal type. All-duralumin construction, fabric-covered. Rudder balanced. Horizontal stablizer adjustable in flight, vertical stablizer adjustable on ground.

Undercarriage.—Split type. Consists of two Vees, the front leg of each incorporating an oleo and spring shock-absorber. The rear legs of each Vee hinges to the lower longerons. Two radius-rods hinge to an attachment on the under side of the fuselage in line with the Vee hinges.

Power Plant.—One 450 h.p. Pratt and Whitney Wasp engine. Fuel is carried in two tanks, one in either side of fuselage, aft of firewall.

Accommodation.—Two seats for pilot and gunner arranged in tandem aft of upper wing. Flotation bags, which can be inflated with carbon dioxide in a few seconds, are carried in canvas packs on either side of fuselage, and provide ample buoyancy to keep plane afloat in event of a forced landing in the sea.

Dimensions.—Span 32 feet, Length 25 feet 4⅞ inches.

Weights.—Weight empty 2,515 pounds, Weight loaded 4,191 pounds.

Performance.—Maximum speed 136 m.p.h., Cruising speed 109 m.p.h., Stalling speed 61.8 m.p.h., Initial rate of climb 1,000 feet/min., Service ceiling 16,400 feet.

Fleet Air Arm Observers

The Army, Navy and Air Force Gazette, September 19.—There seems to be a disinclination on the part of junior naval officers to qualify as observers. Their attitude appears to be that they all want to be pilots and to fly their own machines, but that the apparently more prosaic work of an observer does not appeal to them. There are (or were when Fleet Orders for September 6 were published) still vacancies for the next course, opening on October 28. It requires little imagination to realize that in time to come the observer in naval aircraft will, if properly trained and fully up to his job, have a more responsible and interesting task to perform than the pilot, and he may well become relatively more important than observers in land machines. His is the duty of seeking out an enemy and of collecting information. For such work he must have a free hand to observe whatever he can, so that it is for him to say what course shall be steered, what points shall be visited, and what objective, if any, shall be attacked. The pilot thus has a rôle of secondary importance; except when an attack has to be made he is but the taxi-driver, so to speak. But on the judgment and knowledge of an experienced observer may well depend whether action is joined or not. Possible candidates may well take note of the fact that those who did well in the first post-war course for naval observers, held in 1921, have since gained promotion in the Service, and the senior of them, Captain E. K. Boddam-Whetham, D.S.O., has been recently appointed in command of the gunboat flotilla on the West River, China.

The R-101 British Rigid Airship

The Aeroplane, October 9; by L. Howard Flanders.—On October 2 the Air Ministry invited the Press to inspect the *R-101* and mooring-mast, preparatory to the first tests in the air. Shed tests had already been made, the engines had been run in the shed and the lift and trim verified.

The visitors were divided into groups and at the appointed time walked down to the shed and were shown all over the ship by guides, who explained the numerous details.

The airship is of the rigid type somewhat similar to the *Graf Zeppelin* in appearance. Constructionally it is a great improvement on all previous designs. The great size of the ship enables steel construction to be employed in places.

The frames are structurally stiff and are not braced as is more usual by radial wires, like the spokes of a cycle wheel.

The length of the ship is 732 feet, the height 140 feet, the diameter 132 feet, and the capacity 5,000,000 cu. feet.

This bare statement of facts conveys little or no meaning to the reader, but comparison with the liner *Leviathan* will give some idea of the airship's colossal size.

The displacement of the airship's hull submerged in the sea to a depth corresponding to the draught of the *Leviathan* would be about 100,000 tons. The displacement of the *Leviathan* is 59,957 tons. The beam of

the *Leviathan* is 100 feet and that of the airship is 132 feet. The steamship is longer than the airship.

The horse-power per passenger is also interesting. The *Leviathan* has 34 h.p. for each passenger carried and the airship 55 h.p. per passenger. Had the full complement of 100 passengers, as originally designed, been carried by the airship, it would have had only 29 h.p. per passenger.

The number of passengers carried compared with the number of the crew is 2.5 for the steamship and 1.5 for the airship with its reduced accommodation.

The ratio of the speed is about two to one, consequently the running costs should not compare too unfavourably.

If the airship hull were submerged in the sea as a submarine the tonnage would be about 160,000 tons.

As many people will be familiar with large ocean liners these dimensions will enable them to visualise the airship as much larger than the largest ocean liner. They must not think that this means long promenade decks, for, except that the lounge is of ample size, the accommodation is cramped.

R-101 is designed for low altitude routes at about 2,000 feet, which would prevent its use on the Great Circle Route direct to India. The loss of hydrogen for each 1,000 feet of altitude is 1/30 the total volume and the loss of hydrogen through leakage is about 100,000 cubic feet per week. Consequently a climb of 1,000 feet would cause a loss of hydrogen equal to that lost by leakage in twelve days.

The gross lift of 150 tons is for climatic conditions of England. In Egypt the lift would be some ten tons less and at the Equator a further two tons lift would be lost by the lower atmospheric density.

The normal crew is fifty. This includes two watches of seventeen, and a third watch to act as a relief to take over when the ship is moored.

At the time of the Press visit the *R-101* was inflated and air-borne in the shed. She was anchored down to eight tons of ballast, and stayed to the top of the shed, to prevent movement. Normally there are 80 to 100 workmen passing in and out of the hull making a variable load of twelve tons which necessitated that the ship should be restrained in both directions as she was ballasted to two tons lighter than air.

Starting the inspection of the exterior of the hull, on the extreme point of the nose is the mooring-spindle. Below this is a ring of holes in the fabric which will be open when the airship is under way. These are for ventilation of the hull. The pressure distribution on the hull is such that the air admitted at bow and stern will maintain the air pressure inside the outer covering at slightly above atmospheric pressure while the actual pressure along the sides of the hull is below atmospheric pressure. This will cause the fabric to bulge outwards and keep a streamline form.

The air escapes at spring-loaded valves amidships.

Below the ring of valves in the nose is a door which when let down connects with a similar gangway on the mooring-tower.

Three small hatchways below the gangway are for the trailing and handling lines.

There are five power-cars each fitted with a Beardmore-Diesel engine of 585 h.p. They are arranged two forward of the control car, two aft of the control car (but further out from the center-line) and one aft mounted centrally just forward of the vertical fin.

Of the two front engines the one on the port side is fitted with a reverse pitch propeller for going astern,—so this engine is not only useless for propulsion but is a constant impediment to progress.

The airship was designed to have variable pitch propellers of a highly-complicated design. These appear to be unsatisfactory as they have not been fitted. Which makes one ask why the engines were not made reversible like ordinary marine Diesel engines, or why the simple variable-pitch reversible propeller exhibited on the stand of the Associazione Italiana di Aerotechnica at the Aero Show this year was not fitted? This Italian propeller was tested out about twenty-five years ago.

The five power cars are similar.

A small petrol engine of about 30 h.p. in each car starts the large engine through the familiar Bendix gear, as used on motor-cars. Two of the cars have air compressors and the other three cars have electric generators driven by the starting engines or by a constant-speed variable-pitch windmill. The compressed air is used for moving the fuel or water ballast from tank to tank to trim the ship.

The instrument board in the car has the

usual instruments,—engine-room telegraph, revolution-indicator, oil-pressure gauge, etc.

A folding ladder gives access to the power cars from the hull.

The Beardmore-Diesel engines are steam-cooled. This method of cooling maintains the water jackets at boiling temperature with a corresponding increase in efficiency, and reduces the size of the radiators to the smallest size possible.

Small triangular condensers are attached to the hull about twenty feet above the engines for three of the power-cars. Steam from the middle engines is condensed in a retractable radiator which may be used to heat the passenger accommodation.

As this radiator is below the engines the water has to be pumped back to the water-tank. A small electric motor drives a centrifugal pump on the under-side of the radiator.

What happens in a temperature of —50 degrees F.? It appears that this pump is always exposed even when the radiator is drawn up into the hull.

The only bulky protuberance other than the power-cars is the control cabin. As seen in the shed, there were three wooden transverse beams passing through the lower portion of the cabin. These are for handling the ship on the ground and are not permanent fixtures.

The interior of the car contains a binnacle, with the direction helm in the middle and the altitude control on the starboard side. On the port side are the telegraphs and speaking tubes, between the engine-rooms and control station. The top of the control-car is open to the chart-room above.

When in the shed access to the passenger accommodation is through a hatchway, into the crew's quarters. Going up the companion way, on the right and left are a number of two-berth cabins of a somewhat primitive nature.

The berths are of canvas laced to a duralumin framework, with thin mattresses and bed-clothes. The partitions between the cabins are made of aeroplane fabric so thin and slack that if any passenger were to sneeze all the other passengers would feel the draught.

The washing accommodation is probably adequate, but not luxurious. The dining saloon, which is over the galley and smoke-room, has a dumb-waiter or lift from the galley. It is rather small, with long tables.

Further aft is the lounge, a really fine room, with glass windows to give a good view of the earth below.

On the deck below is a small smoking-room with a duralumin floor to act as an ash tray. The galley is well equipped with electric cookers, glass cupboards, and all the necessary equipment of that department. It is worth noting that the ventilation of the galley is arranged with scoops, in the slip-stream of the forward starboard engine to isolate the smell of cooking and prevent the menu from announcing itself automatically an hour or so before dinner.

Further aft is a chart-room of ample dimensions, communicating with the control-cabin below. On the port side of the chart-room are the engine revolution indicators, altimeter and other instruments. On the starboard side is a statascope and the wireless compartment.

The wireless cabin is fully equipped for transmission and reception. A rotary converter generates a 2,000-volt high-tension supply and a rotary interrupter is used for i.c.w. The transmitter may be tuned to any wave-length from 300 meters to 1,600 meters. The usual receiving apparatus is installed with extensions to various parts of the ship.

The electric power distribution board is in the middle of the crew's accommodation.

A gangway runs from end to end of the ship. Transverse gangways at each frame give access to the valves, gas-bags, and the hydroelectric servo-motors for controlling the height and direction rudders.

At the power-cars these transverse gangways give access to hatchways and ladders down to the engines.

The gangway aft to the accommodation is not open for passengers.

The forward gangway is about three feet wide and leads to the entrance gangway to the mooring-tower.

A small ladder to the starboard side of the main gangway leads up to the mooring cabin.

In the mooring cabin may be seen the end of the mooring-spindle, which is stayed to a ring with tension spokes like a bicycle wheel. This ring is attached to the frames and takes all lateral loads on the spindle. Here may be seen the connections for fuel, water, and electric supply at the mast and for the tele-

phone to the ground. A winch carries the mooring cable.

The normal fuel, a heavy oil with a high flash-point of 200 degrees F., a low viscosity and costing only £5 per ton, is carried in cylindrical tanks distributed in various parts of the ship. This may be blown from tank to tank by compressed air to trim the ship. The water-ballast is carried in similar tanks and may be blown from tank to tank for trimming purposes like the fuel.

The normal fuel capacity is 29 tons, the maximum possible is 44 tons. Eight tons of water are carried in emergency bags, which may be emptied rapidly. And 7 tons are in tanks for trimming purposes.

The only petrol carried is in small tanks in the power-cars. These tanks may be jettisoned in case of danger of fire. Some of the heavy-oil fuel-tanks have facilities for jettisoning the fuel to get a rapid lift in emergency.

The officers of the ship are the skipper, navigator, and first and second officers. The watch is composed of engineers and riggers, direction and height coxswains.

When starting a flight or returning to the tower two engineers are required for each engine, and there are the various winches to be manned. Consequently one presumes that both watches are turned out.

It must not be forgotten that all controls must be manned while the ship is at the control-tower. Their duties, in addition to any minor repairs, cleaning and overhaul, are maintaining the static trim, manning the altitude rudder, and in bad weather keeping the engines warmed and ready to start.

The whole construction and organization appears very complete and inspires confidence.

MISCELLANEOUS

Armament and Protection of Cruisers

The Relation between Armament and Protection in the 10,000-ton Cruisers and the Ersatz-Preussen.[1]

By Professor William Hovgaard

There has been a great deal of discussion and criticism of the 10,000-ton cruisers now built or building by the naval Powers signatory to the Washington Treaty for the Limitation of Naval Armament, and these ships, which will be here referred to as the "treaty cruisers," have been compared with the German armored cruiser *Ersatz-Preussen*. A comparison is difficult to make, because it must be based largely on inaccurate or incomplete information. While the speed and armament of most of these vessels have been given out more or less officially, the protection is in no case known with certainty; in fact, a significant silence has been maintained on this point. In several instances the comparison has been made in a sensational spirit; some elements have been singled out for comparison without regard to the design as a whole, and often an exaggerated importance has been given to certain features of the construction. It is proposed here to compare these vessels in the light of fundamental principles, in particular that governing the relation between armament and protection, which will be referred to as the "Principle of Corresponding Protection."

The Principle of Corresponding Protection.—We include in the discussion all ships in which artillery is the principal weapon: battle-ships, battle-cruisers, armored cruisers, light cruisers, and gunboats, and refer to them as artillery ships as distinct from torpedo vessels, airplane carriers, and mine-laying vessels. It may be stated as an axiom that a ship cannot be protected in an absolute sense. It is easy to imagine exceptional circumstances, such as firing at close range and normal impact of projectiles, against which any armour, which it is practicable to give a ship, is insufficient. We must accept the risks attendant on exceptional conditions, and rest satisfied with a system of protection which renders a ship fairly secure under what may be described as "probable average conditions of fighting," an expression which will be defined in detail hereafter. In order to arrive at a rational design of the protection, it is necessary to make assumptions as to the armament of the adversary which the ship is destined to fight, in particular as to the caliber of his guns. Evidently it is impossible or impracticable to provide protection against attack from a ship of far superior gun-power. It would not be reasonable to protect a light cruiser against the heavy guns of a battleship, although she may at times be exposed to such attack. Here, again, the design should provide for the circumstances most likely to occur, not for exceptional conditions. On the other hand,

[1] Paper read at the summer meeting of the Institution of the Naval Architects in Rome, September 18, 1929. Abridged.

any warship should be prepared to fight ships of its own class and size and carrying the same armament, and hence should be protected against attack from guns of the same caliber as those carried by the ship itself. It will therewith also be adequately protected against all ships of inferior gun-power. We see, then, that armament and protection should not be considered separately and as being independent of each other, but rather as organically associated. The thickness of the armor should be a function of the caliber of the guns.

Evidently by basing the design of the protective system on a fight with an adversary of identical armament, we shall provide for all ordinarily occurring circumstances, including actions with lighter vessels, and we shall now examine what protection will be appropriate in such case. Assume that one ship, A, armed, for instance, with 8-inch guns, and unprotected or protected by very light armor, is matched against another ship, B, of the same size and class, likewise armed with 8-inch guns, but of slower speed, and carrying an armor which under average fighting conditions will offer adequate protection against the fire from 8-inch guns. Then, other things equal, the former ship will almost certainly be destroyed, sooner or later, perhaps at the very beginning of the fight, while the latter has good chances of sustaining a long continued battle. The ship A has one advantage, that she can withdraw and thus avoid action, but in that case she will generally be unable to fulfil her mission. Even when A falls in with smaller ships, carrying lighter guns, for instance of 6-inch caliber, she will not be exempt from the risk of being destroyed or of suffering serious injury, since conditions of visibility may be such as to necessitate fighting at close range. The protected ship B will be at an advantage under all circumstances. We refer to her protection as "corresponding," that is, the armor corresponds to or matches the guns which she herself carries.

It remains to consider a special case, where all ships of a certain class, belonging to different navies, are of the same size and carry guns of the same caliber, and where all are more or less deficient in protection, that is, they fall below the standard of "corresponding" protection. This case is quite exceptional, and would hardly be worth discussing were it not that it actually occurs in the treaty cruisers. For the purpose of discussion, let us assume that all these ships are identical. It might then be supposed that since all are on equal terms, the deficiency in protection would be unobjectionable; one ship would be as likely to be destroyed as another. But in a fight between two such vessels both are exposed to immediate destruction by a lucky salvo from the opponent, and the issue becomes a matter of chance. This is contrary to military principles. The strategy and tactics of all great military and naval leaders have been to leave as little as possible to chance. It is always sought to bring superior force to bear at the point of contact and to provide ample reserves so that a long continued battle may be sustained. Exposure to complete destruction, even if this danger is shared by the enemy, is generally avoided, as evidenced by the fact that fighting ranges between warships have increased about in the same proportion as the ranges of guns and torpedoes. Commanding officers prefer to fight at ranges where sustained fighting becomes possible, and where skill in handling ships and guns takes the place of mere chance. In a fight between two treaty cruisers, the commanding officers can avoid destruction only by overwhelming the enemy at the beginning of the action. Hence the tendency to over-gunning of these ships. The state of such vessels may be likened to one of unstable equilibrium, where a small irregularity is apt to disturb the balance. If any of the Powers concerned should break away from the vulnerable standard type now established, all will have to follow, and existing cruisers will be at once depreciated in value. The appearance of the *Ersatz-Preussen,* in which not only the protection but also the armament has been improved as compared with the treaty cruisers, threatens to bring about this condition. The existing artificial balance, created by artificial conditions, has been destroyed. We shall discuss the design of the *Ersatz-Preussen* later; for the present it is merely desired to point out that the particular solution represented by the treaty cruisers is unsatisfactory. It is seen that the under-protected ship, whether she meets ships armed with heavier guns, guns of the same caliber as her own, or lighter guns, is always at a disadvantage, and always liable to destruction or serious injury. The over-protected ship all

agree to be unsatisfactory. We find no resting-point except in the principle of corresponding protection, assuming that the adversary is a ship of the same class carrying guns of the same caliber, and designing the system of protection accordingly.

It remains to explain what is meant by the expression "probable average conditions of fighting." The principal factors which affect an artillery action are the range and the angle of impact of the projectiles with the normal to the armor. This angle depends on the position of the plane of trajectory relative to the ship, on the angle of fall of the projectile, and on the rolling and pitching of the ship. It also depends on the position of the armor relative to the ship, whether vertical, horizontal, or sloping. The range as well as the angle of impact are subject to changes, and have to be selected in each particular case, but we shall not here enter into a detailed discussion of these points.[2] The designer must determine the figures which to him seem most plausible as representing average conditions, but it is clear that in any case a rational design of the protection must be based on some fairly well-defined assumptions. Summing up, the principle of corresponding protection may be thus formulated: An artillery ship should be so protected that it can keep up a sustained fight under average conditions with a ship of similar size and type carrying the same armament.

This principle was propounded by the author in 1904[3] in connection with a study of the sea-going battleship, and it was pointed out that it must hold good for all artillery ships. In 1905,[4] the author discussed its application to cruisers, and especially emphasized its importance for a new type which he then proposed and called the "battleship-cruiser," afterwards known as the "battle-cruiser." This new type was conceived as virtually a battleship of high speed, with some reduction in the number but not in the caliber of the guns, and practically the same armor protection. By refinements in hull construction and machinery, it was expected that it would not need to be very much larger than the battleship. The principle did not, however, find general acceptance, although it was always followed in most battleships. In 1907, the first battle-cruisers, the British Invincible class, were launched, but their protection fell far short of that "corresponding" to the guns. The same was true, but to a smaller degree, of later British pre-war battle-cruisers, and the first ship of this class in the British Navy to be protected fairly in accordance with that principle was the *Hood*, as redesigned after the experiences of the battle of Jutland. The German battle-cruisers, on the other hand, had a protection corresponding to their armament. The light cruisers that took part in the war, British as well as German, were practically provided with corresponding protection, having 3-inch to 4-inch armor and 4-inch to 6-inch guns. These vessels showed a remarkable power of resistance under fire. Admiral Jellicoe, in *The Grand Fleet*, says: "The relative values of protection and gun-power had frequently engaged my serious attention. It was also a subject of much discussion amongst writers on naval matters, some of whom went to the length of suggesting that all available weight should be put into gun power, and that ships should be left practically without armor. Their views were based on the argument that 'the best defense is a powerful offensive.' Although this argument is very true when applied to strategy, the war has shown its fallacy as applied to matériel. The loss of the *Good Hope, Monmouth, Queen Mary, Indefatigable, Invincible, Defence,* and *Warrior,* and the considerations to which these losses gave rise convinced naval officers afloat, even if they did not convince others less intimately associated with the Fleet during the war that ships with inadequate defensive qualities are no match for those which possess them to a considerably greater degree, even if the former are superior in gun-power. The conviction was strengthened by the knowledge we obtained, that German ships, far more frequently hit by gunfire, torpedo, or mine than many of our ships that sank, were yet taken safely into port, owing partly to their defensive qualities, but partly to the limitations of our armor-piercing shell at that time." But even after the experiences of the war, and in spite of opinions clearly expressed by leading officers with war experience, the principle has not yet been accepted, as evidenced from the design of the treaty cruisers.

[2] See paper by the author, "The Cruiser," *Am. Soc. Nav. Arch. and Mar. Eng.*, 1905.

[3] "The Sea-Going Battleship," *Am. Soc. Nav. Arch. and Mar. Eng.*, 1904.

[4] "The Cruiser," *ibid.*, 1905.

The Treaty Cruisers.—The displacement of these ships is limited by the Washington Treaty to 10,000-tons in the light condition, that is, fully equipped, but without fuel and feed-water. This gives a normal displacement of about 12,000 tons, and a full-load displacement approaching 14,000 tons. The caliber of the guns is limited to 8 inches. There seems to have been a general agreement among the leading naval officers in the countries concerned that the speed of these vessels should be the highest consistent with a powerful armament, and actually the speed is from about thirty-two knots to thirty-six knots. Speed and armament dominate the design, in some cases almost to the exclusion of protection. In most vessels, armor is provided for only locally, or where it can be utilized as part of the strength hull. It is argued that although these vessels are liable to be used in fleet actions, their principal duties are scouting, support of destroyers, protection of commerce, and attack on enemy sea communications, and, apparently, it is contended that for these duties, hard and long-continued fighting is not required. Yet it must be admitted that while such vessels can generally avoid action with capital ships, they cannot always avoid serious action with ships of their own class, or with smaller cruisers and armed merchant vessels. The 8-inch gun has been adopted for the primary battery in all these vessels, and seems very appropriate, being at once the largest permissible gun, and probably also the heaviest that can be efficiently worked in ocean-going ships of this size and speed. The number of 8-inch guns is from eight to ten in each ship, generally mounted without protection. The requirement of great steaming endurance was easily complied with, since no limitation was imposed on the weight of fuel, and we find therefore the unusually large allowance of 35 per cent to 40 per cent of the light displacement for fuel and reserve feed-water. With such extreme requirements of speed and armament, associated with the necessity for high freeboard in order to secure good sea-going capability at high speed, the weight available for armor was necessarily small. Thus, the designers have been forced to accept thicknesses of armor which are out of proportion with the powerful weapons which they carry. The result is a very vulnerable type of ship, the protection, as far as known, consisting of a side belt or an armor deck, or both, varying in thickness from 1½ inches to 3 inches.[5]

The British Suffolk class, ordered in 1924, is believed to represent the most conservative and best-protected type, the designed speed being only 31.5 knots. The freeboard is very high from end to end, and bulges are provided against submarine attack. Later British cruisers seem to have been designed more for speed, and the power is increased from 80,000 s.h.p. to 90,000 s.h.p. The French commenced with a designed speed of 34.5 knots in the Tourville, which is said to have very little protection, but in the Suffren, the power was reduced from 120,000 s.h.p. to 90,000 s.h.p., giving a speed of 32 knots. The saving in weight so effected was used to increase the armor protection.[6] The American ships of the Pensacola class, with a designed speed of 32½ knots, were originally intended to carry twelve 8-inch guns,[7] but this number was reduced to ten and, in later cruisers, to nine. The Italian Trieste class is credited with a speed of 36 knots. The Japanese Nachi class is said to have a speed of 33 knots, and the battery comprises ten 8-inch guns. On the whole, the speed seems higher than necessary for the performance of the principal duties, since only few warships of superior gun-power and no merchant vessels have a speed of more than 28 knots. The number of 8-inch guns also seems unnecessarily great, and, as explained below, it appears that a more satisfactory and harmonious solution can be obtained by a reduction in speed and in the number of guns, whereby weight is saved for improved protection.

Ersatz-Preussen.—Again, in this vessel the standard displacement is limited to 10,000 tons, but a caliber of 11 inches is allowed for the heavy guns. The strategical purpose of this ship has not been announced officially, but it may be conjectured that it is intended partly for service in the Baltic and partly for raiding or commerce-destroying on the ocean. Evidence of the former purpose is seen in the heavy battery of 11-inch guns, which is especially suitable for a ship of that size operating in narrow seas.

[5] Most of the data here given are obtained from *Brassey's Naval Annual*, 1928, or from *Jane's Fighting Ships*, 1928, but are believed to be partly unofficial.

[6] *Moniteur de la Flotte*, January 7, 1929.

[7] Admiral A. P. Niblack, *Brassey's Naval Annual*, 1926, page 108.

In fact, with the armament of six 11-inch guns and a secondary battery of eight 6-inch guns, this ship is superior in artillery power to any warship in the Baltic, excepting the Russian battleships. On the other hand, the speed which is 26 knots, and the radius of action, which is 10,000 miles at 20 knots, seem to show that the ship is also intended for long continued and distant ocean service. Under ordinary circumstances it might well be questioned whether it is wise to build ships for two such widely differing purposes. In Holland, due to financial restrictions, a similar compromise was adopted in the Piet Hein class (1894), which was a ship of *double usage*, to be used both for home defense and for service in the East India colonies, but the result was not satisfactory. In the *Ersatz-Preussen* the armament is usually heavy for a lightly-built sea-going cruiser of 12,000 tons normal displacement, having a speed of 26 knots. Earlier armored cruisers of good design and of the same size, such as the Scharnhorst, were armed with 8-inch guns, and had a speed of only 23 knots. As a platform for 11-inch guns the *Ersatz-Preussen* may be found rather wet and unsteady for service on the ocean. For service in the Baltic the high speed and great endurance are unnecessary, and a good protection would be of greater value. Thus the *Ersatz-Preussen* must be regarded as a compromise adopted under compelling limitations, but the exceptional circumstances under which it appears are remarkably favorable. In the Baltic she will be supreme, except for the presence of a few relatively slow Russian battleships, and on the ocean she will be either much more powerful or else much faster than any other vessel, with the sole exception of a few battle cruisers. Protection of commerce against the depredations of such vessels can only be obtained by the convoy system.

Technically the *Ersatz-Preussen* presents several interesting features. The radius of action, which at ordinary cruising speeds far surpasses that of the treaty cruisers, has been made possible by the use of Diesel engines. This type of engine is here tried for the first time in larger warships, and the maximum power, 50,000 s.h.p., is at least twice as great as that of any other ship driven by Diesel engines. This must be regarded as an experiment, but the Germans are certainly in a better position to take such a step than anyone else. If the engines prove to be reliable in long continued service, if they do not cause excessive vibrations, and provided also that the unit weight is not greater than that of recent steam plants of similar power, they must be regarded as a remarkable achievement and a great step in advance in marine engineering. General Gröner, German Minister of Defense, has stated officially that by improved methods of design and construction a saving in hull weight of 550 tons has been effected. This presumably refers to a comparison with earlier German ships, and is said to be attained by an extensive application of welding and of special high-grade steel as well as light alloys. The armor is worked into the hull structure wherever possible, so as to co-operate with the strength members. All of these methods are, of course, used in other navies, and are undoubtedly resorted to in all treaty cruisers; but whether or not the Germans have gone farther in this respect than the constructors in other countries cannot be known until further details are disclosed. It is not known, for instance, whether welding is applied to strength members in the *Ersatz-Preussen*, but, if so, must again be regarded as an experiment. The employment of armor as part of the strength hull is believed to have been introduced on a large scale first in the British *Arethusa*, built just before the war; it is not unobjectionable, as it is difficult to obtain an effective transition between the armored and the unarmored parts of the structure without special precautions, which may require the expenditure of a great deal of extra material. If these precautions are omitted serious structural weaknesses are apt to develop.

As seen from Figs. 1 and 2, the general design is in principle the ideal one adopted by Sir William White in the old Royal Sovereign class; one heavy gun turret at each end beyond the machinery spaces and a powerful scattered secondary battery between the heavy gun stations. This arrangement is indeed similar to that adopted in most of the treaty cruisers, but by the use of heavier guns and triple turrets the high super-firing installations are avoided. There is only one mast and one funnel, and the conning tower is given a well-isolated position. On the whole, the design is characterized by a harmonious simplicity which cannot fail to lead to economy of weight.

Judging from the sketch, the freeboard seems rather low for an ocean-going ship of such high speed.[8]

As regards the protection, nothing of a reliable nature is known, but a comparison of estimated weight schedules for the *Ersatz-Preussen* and the treaty cruisers throws some light on this question. Two such estimates have been made, one published in *Werft Reederei Hafen*,[9] the other, by James L. Bates, of the Design Division, U. S. Bureau of Construction and Repair, published in the *American Engineering*.[10] The German writer gives the following comparative weight schedules for the *Ersatz-Preussen* and the British *Suffolk*, which latter, it must be noted, was designed some four years before the German ship:

Fig. 1. ERSATZ-PREUSSEN

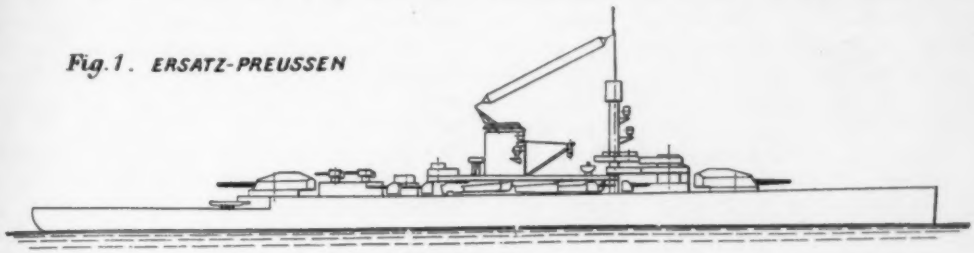
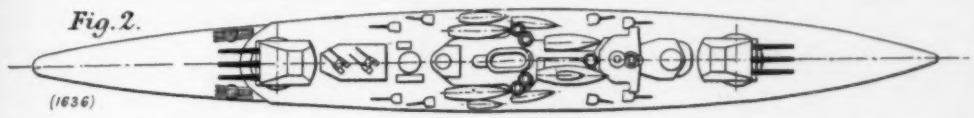


Fig. 2.



(1636)

TABLE I

	Ersatz-Preussen	*Suffolk*
	Tons.	Tons.
Hull without armor	3,700	4,400
Armor on ships and guns	2,700	2,000
Various auxiliary machinery	480	400
Equipment and stores	430	430
Propulsive machinery	1,150	1,930
Armament and ammunition without armor	1,700	1,000
Light displacement	10,160	10,160
Fuel	3,500	3,460
Reserve feed-water	40	380
Full load displacement, totals	13,700	14,000

This table indicates a saving of 700 tons on the hull and 780 tons on the machinery of the German ship as compared with the British cruiser, while there is an excess of 700 tons in the weight of armor, 700 tons in the armament group, and 80 tons in the auxiliary machinery. If the weight assigned to armor in the *Suffolk* is correct, it indicates a very substantial system of protection. Mr. Bates makes a comparison between the *Ersatz-Preussen* and what he considers a general average of the treaty cruisers. He estimates the saving in total weight of machinery in the German ship to be about 1,100 tons, and in hull weight about 350 tons. He adds to this a saving of 150 tons on hull fittings and outfit, making a total saving of about 1,600 tons as compared with the typical treaty cruiser. On the other hand, he allows for an excess weight of ammunition of 200 tons, so that there remains 1,400 tons available for improvement in protection, additional to that already utilized for this purpose in the average treaty cruiser. Based upon this estimate, which is explained in more detail in the article referred to, Mr. Bates presents a conjectural lay-out of the armor protection in the *Ersatz-Preussen*. The principal features in this system are a belt of 5-inch to 3-inch thickness, an armor deck of thickness varying from 1½ inches to 3 inches, and a 1¾-inch torpedo bulkhead on each side abreast of machinery spaces and ammunition rooms. This lay-out of the armor seems plausible, and is probably as near the truth as it is possible to arrive on the basis of the available information. Assuming that some of the armor is worked into the hull as an integral part of certain strength members, and allowing for two armor decks, an independent weight calculation seems to show that the total weight of armor arranged as assumed by Mr. Bates is about 2,700 tons, agreeing closely with the

[8] *Werft Reederei Hafen*, January 22, 1929, page 36.

[9] February 7, 1929, page 54.

[10] April, 1929, page 185.

German estimate given in Table I. It is, of course, possible that greater thicknesses of armor are actually fitted, especially on the sides, but in such case the belt must be of smaller height or extent than here assumed. However this may be, the weight given to armor, although a considerable percentage of the displacement, is yet small if considered in the light of the principle of corresponding protection. The A.P. projectile of the 11-inch gun at 10,000 yards is estimated to have a penetrative power of at least 8-inch of Krupp armor under normal impact, so that even allowing for obliquity of impact the armor of the *Ersatz-Preussen* will not be "corresponding" to the guns. So also the 8-inch gun at a range of 8,000 yards has a penetrative power of 5 inches to 6 inches of Krupp armor against which attack the protection of the treaty cruisers is inadequate. Hence, comparing the *Ersatz-Preussen* with the treaty cruiser, it is seen that while the former excels in armament, the latter excels in speed, but both are about equally deficient in protection in relation to the armament which they carry. It is of interest to note that the Scharnhorst (1906), 11,400 tons, 23 knots, which was armed with 8-inch guns, carried 6-inch armor on the sides; and the Swedish battleship, *Gustaf V* (1918), 8,000 tons, 23½ knots, has guns of the same caliber as the *Ersatz-Preussen*, but 8-inch armor on the sides.

A 10,000-ton Cruiser with Corresponding Protection.—Without attempting to present a new design, we shall outline the main features of a 10,000-ton cruiser carrying a battery of 8-inch guns with corresponding protection, and see what speed it would be possible to obtain under these circumstances. Based on the argument that a small number of protected guns are preferable to a greater number of unprotected guns under conditions of sustained fighting, it is proposed to reduce the number of 8-inch guns to six, carried in two armored triple turrets, placed one forward and one aft. Leaving the anti-aircraft battery the same as in the treaty cruisers, we reckon a saving on guns and mounts with ammunition but without armor of 275 to 550 tons as compared with this weight group in treaty cruisers carrying eight or ten guns respectively in super-firing installations. In order to determine what would be the corresponding protection, we adopt the following "average conditions of fighting": For 8-inch 55 caliber guns the fighting range is assumed to be 8,000 yards. The angle of impact of the projectiles with the normal to the side armor is reckoned 25 degrees and the average angle under which the flat deck armor is struck 10 degrees to 15 degrees, taking into account the combined effect of the angle of fall and the angle of roll of the ship. The penetration of 8-inch guns at 8,000 yards under normal impact is reckoned to be about 6 inches of Krupp armor, so that under the assumed conditions of oblique impact 5-inch armor should afford a reasonable protection. We suppose then that the armor belt is of 5-inch thickness abreast of machinery and ammunition rooms and 3 inches at the ends. The deck armor should have an average thickness of about 2 inches, not including the ordinary thickness of deck-plating, but may be so disposed as to give increased thickness over ammunition rooms and steering gear, and may be distributed over two decks. The guns and barbettes are assumed to be protected by a weight of armor corresponding to an average thickness of 4 inches, distributed according to the relative importance of the various parts. The system of protection so obtained approaches closely to that at which we arrived in the *Ersatz-Preussen*, except that armored torpedo bulkheads are not included. It is estimated that this protection can be carried on the displacement of 10,000 tons, taking into account the saving in weight of the armament group and provided the power of the machinery is reduced to about 75,000 shaft horsepower. At this power a speed of about 29 knots is expected under ordinary conditions of loading. The estimate here presented is admittedly crude, but is believed to be sufficiently accurate to indicate that the intermediate type at which we have arrived would have a speed superior to all battleships, most existing battle-cruisers and all ocean-liners. It would be a dreaded enemy of the present treaty cruisers and of all smaller light warships as well as all merchant vessels.

NOTES ON INTERNATIONAL AFFAIRS

From October 4 to November 3

Prepared by Professor Allan Westcott, U. S. Naval Academy

NAVAL NEGOTIATIONS

Invitations to January Conference.—In the course of their week-end conference at the President's camp in Virginia, President Hoover and Premier MacDonald issued an announcement on October 6 that January 20 had been agreed upon as the opening date for the five-power naval conference, and that invitations would be sent out next day by the British Foreign Office to France, Italy and Japan. Notable points in the invitation were: (1) Inclusion of battleship reduction as a suggested subject for consideration; (2) Anglo-British agreement as to desirability of abolishing submarines; (3) Definite recognition of parity between British and American fleets, the British fleet to be taken to include warcraft of the various dominions; (4) Provision for preliminary discussions with other powers and for suggestions as to the agenda of the conference.

Favorable Replies.—Within a week after the issue of invitations to the naval conference, favorable replies were received from Japan, Italy, and France. No conditions were attached to these replies. The French acceptance was despatched by Premier Briand on October 16, regardless of the fact that his cabinet had wished further time to discuss it. The only significant feature of Premier Briand's note was its emphasis on the point that the work of the conference was to facilitate the task of the League preparatory commission, and that of the later general conference on disarmament under League auspices.

Franco-Italian Parleys.—While arrangements for the London conference were going on, the Italian government made overtures to France for preliminary naval negotiations on the general basis of (1) parity for French and Italian fleets, (2) interdependence of naval, land, and air disarmament, (3) fixation of maximum total tonnage, with freedom for each nation to allocate this total among the various categories of ships according to its own preference. Negotiations between the two powers were in fact already under way at the time of the fall of the Briand Ministry. France, while arguing that her colonies and two coast lines called for a larger fleet than Italy's was willing to offer guaranteed parity of forces in the Mediterranean. The size of the French and Italian fleets in the Mediterranean will of course be a factor in determining England's cruiser requirements. As regards submarines, France will oppose abolition, but will accept limitation of size to 600 tons.

American Delegates.—Before the close of October it was announced that Secretary of State Stimson would head the American delegation, with Senators Reed of Pennsylvania and Robinson of Arkansas as additional members. Rear Admiral William V. Pratt and Hilary Jones were selected as chief members of the technical staff. It was expected that Ambassadors Dawes and Hugh Gibson would complete the delegation.

Premier MacDonald's Visit.—Premier Ramsay MacDonald's long anticipated American visit began with his arrival in New York on Friday, October 4. With his daughter Ishbel he spent the week-end in conferences at President Hoover's fishing camp in Virginia. After a series of visits, dinners, speeches, and conversations in Washington, the Premier returned to New

York on October 10, where the chief event was a dinner given by the Foreign Policy Association at which Mr. Elihu Root presided. Three days later the Premier left for brief visits to Ottawa and other Canadian cities. He was back in London a month after his departure. Premier MacDonald's ready eloquence, sincere idealism, Scotch humor, and canny skill in avoiding dangerous definitness of assertion combined to make his visit a complete success in furthering the cause of Anglo-American understanding.

Topics and decisions of the Premier-Presidential conferences remained indefinite. It was understood that tariffs, American entry into the league, and war debts, were taboo; that, in addition to strictly naval problems, the topics broached included measures for preventing liquor smuggling, renewal of the Anglo-American arbitration treaty, trade rivalry in the international field, and the old problem of neutral commerce in wartime, or freedom of the seas. A joint statement issued on October 9 contained the following points: (1) "We have agreed that all disputes shall be settled by pacific means," and that the Kellogg Peace Pact is to be accepted "as a positive obligation to direct national policy in accordance with it; (2) We approach historical problems [e.g. trade rivalry and freedom of the seas?] from a new angle and a new atmosphere . . . . their solution has become possible . . . . our two governments will begin conversations upon them; (3) We have been able to end competitive building . . . . by agreeing to parity of fleets, category by category." Premier MacDonald made a supplementary statement, as follows:

I have achieved more than I hoped. The one thing that was ever possible from a short visit like this was to get into personal contact with the President and to get it definitely stated in a common pronouncement that Anglo-American policy would be conducted on the assumption that not only was war between us impossible, but that our Navies would not come into conflict with each other.

We have both reiterated our adhesion to the pact of peace, and, moreover, have announced to the world that we are going to apply it in our practical policy. We have both agreed constantly to keep the pact in front of us and to use it for the purpose of coming to an agreement on subjects which have defied agreement up to now.

In consequence of that, I take with me to London a series of questions all of which are now to be the subject of study by the various departments concerned and of consideration between the Dominions and ourselves with the object of coming to agreements upon them.

All this has been arrived at, not for the purpose of dividing America and ourselves from the rest of the world but rather, as is indicated in an early paragraph, to enable each of us to be more effective than ever in coöperating with other nations to establish the security of peace.

BRITISH BASES IN WESTERN ATLANTIC.—Referring to the conferences between President Hoover and Premier MacDonald, the New York *Times* (October 9) wrote as follows:

The question of demilitarizing the British naval bases in the western Atlantic is understood to have been touched on, but whether any decision was reached has not been disclosed.

The subject has arisen in unofficial speculation from time to time, but not until now has there been any evidence that it was occupying the attention of the official negotiators. It appears to have been taken up by the President and Prime Minister as laymen and not at the prompting of either the British Admiralty or the United States Navy Department.

Four bases are involved, those at Bermuda, Kingston (Jamaica), Trinidad and Halifax. As to the latter, the consent of Canada would be specifically required for demilitarization, and it is possible that Mr. MacDonald will mention the subject in his conversations with Premier Mackenzie King later this month.

So far as United States naval experts are concerned, there is only lukewarmness for the proposal, as they do not consider the British Navy a menace to the United States and recognize that the bases are important for the protection of British trade routes.

It is felt also in some circles that should Great Britain determine to demilitarize the bases, demands might follow from other powers for the demilitarization of the Panama Canal. The argument could be used that the Suez Canal is bare of military defenses and that there is no need for coast defenses at the Panama Canal. That American military and naval chiefs are opposed to removing the defenses of the Panama Canal is well known.

"A STRONG MAN ARMED."—*The Living Age* of October 15 quoted the following editorial from the London *Morning Post* as expressing British conservative opinion in naval reductions:

The British people, who love their Royal Navy, and know what dreadful fate it saved them from in the Great War, are naturally nervous about these disarmament negotiations. They do not like the precipitation with which the Prime Minister rushed into the subject:

I will wear my heart upon my sleeve.
For daws to peck at.

Nor do they like his favorite argument, which connects the pursuit of peace with the reduction of the Navy. They may be forgiven for preferring an

authority whose humanity and whose wisdom it would be impious to question: "When a strong man armed keepeth the house, his goods are in peace."

GERMANY

DEATH OF FOREIGN MINISTER STRESEMANN.—With the death of Foreign Minister Gustav Stresemann on October 3, Germany lost a statesman universally recognized as her wisest and ablest since the war. Herr Stresemann died suddenly from apoplexy, aggravated by chronic kidney trouble. For five years he had maintained the conduct of foreign affairs through changing ministries and constant party strife, pursuing steadily his policy of international understanding and economic recovery. Among the accomplishments in which he was largely instrumental were the Locarno agreements, Germany's entrance into the League, the signing of the Kellogg Peace Treaty, and finally the successful negotiations for the Young Plan. Upon the ratification of the latter he had planned to give up public life. At the imposing state funeral in Berlin on October 6, his body, like that of Friedrich Ebert, first Reich President, was borne through the central arch of the Brandenburger Tor, formerly reserved for Hohenzollerns.

GREAT BRITAIN

DOMINION STATUS FOR INDIA.—In a statement at the close of October the British Viceroy of India, Lord Irwin, declared, "I am authorized on behalf of the Government to state clearly that in their judgment it is implicit in the Declaration of 1917 that the natural issue of Indian constitutional progress as there anticipated is the attainment of dominion status." While a definite indication of the policy of the present Labor Government, this statement was not, however, intended to anticipate the findings of the Simon Commission, which, after two years' study of Indian government problems, will submit its report early in 1930. This, according to present plans, will be followed by a conference of British and Indian representatives, after which the proposed reorganization will be drafted into a Parliamentary bill.

FRANCE

TARDIEU FORMS NEW CABINET.—On November 2 André Tardieu, wartime High Commissioner of France in the United States, succeeded in organizing a new French cabinet after one of the most confused ministerial crises in recent French political history. The cabinet was composed of representatives of the Center and Right center parties, after refusal of the Radical Socialists (the chief moderate Left group) to collaborate. In the event of failure of the Tardieu Ministry to command a safe majority in the Chamber, a new election may be necessary. In the new cabinet M. Briand retains control of foreign affairs.

The fall of the Briand Ministry, which had held office since the illness and resignation of M. Poincaré last July, came unexpectedly on October 22, the first day of the parliamentary session, when M. Briand's resolution to defer discussion of foreign policy was defeated 288 to 277 by a combination of the more extreme Right and Left parties. M. Edouardo Deladier of the Radical Socialists at first attempted to form a new ministry but failed through refusal of the Socialists to join with the more bourgeois Radical Socialists. His failure was followed by that of another Radical Socialist leader, M. Etienne Clementel.

INTERNATIONAL BANK

WORK OF ORGANIZING COMMISSION.—At the close of October the international committee of bankers, which had been in session at Baden-Baden throughout the month, had practically completed its task of setting up the framework of the new Bank of International Settlements. The final text of the bank's statutes and charter had been worked out, and it was hoped that the trustee deed, setting forth the conditions required of the nation in which the bank is to be located, would be ready for approval at a plenary session on November 4. In concluding their work, however, the bankers left unsettled a number of problems which will have to be taken up again at another conference of political representatives at the Hague, chief among these being the question whether the seat of the bank is to be in London, Brussels, or some Dutch or Swiss city. In general the committee inclined toward limiting the functions of the bank rather strictly. Its operations in any given country will be subject to the approval of the central bank of that country, and revision of its statutes in more important matters will be controlled by the governments under whose auspices the bank is being created.

LATIN-AMERICA

Paraguay-Brazil Treaty.—On October 28 the Paraguayan Chamber after long debate ratified a treaty with Brazil settling an old dispute between the two countries over certain territory on the west bank of the Paraguay River. Although the treaty apparently sanctioned Paraguay's claims to territory which is also disputed with Bolivia, its ratification was hotly opposed in the Chamber, chiefly because of hostility toward the government's pacific policy in consenting to negotiations with Bolivia.

Chaco Dispute Unsettled.—Following the breakdown last summer of the efforts of the international commission appointed to settle the boundary quarrel between Bolivia and Paraguay, the American State Department has sought to have a new commission appointed in which the "A B C" powers (Argentina, Brazil, Chile) should take an active part, and which should convene at Montevideo. The "A B C" powers, however have shown clearly their preference for "hands off," and moral support only, in the settlement of a problem so close to their own frontiers. Meantime war sentiment in the two countries has again been aroused by an alleged speech of ex-Foreign Minister Elio of Bolivia, in the course of which he is said to have declared that at the time of the Chaco crisis Bolivia refrained from war simply because shipments of war munitions had not come in.

FAR EAST

Civil War in China.—During October the long threatened uprising of disgruntled generals against the Nanking government was in full swing. According to the Nanking version of the revolt, it was due primarily to the efforts of the central government to cut down the immense military forces scattered through the country. Leaders of the Kuominating or "People's Army" (to use the name adopted by the rebels) emphasized, on the other hand, the corruption and narrowly partisan make-up of the Nanking rule, and declared that the government was disbanding only those military forces not under its direct control. During the month Manchurian leaders maintained neutrality between the two factions, and a similar attitude was taken by Yen Hsi-shan, the "model governor" of Shansi, whose accession to either side would have been sufficient to determine the outcome. Much depended on the ability of Nanking to raise funds with which to buy off the various rebel factions. At the close of October rival forces reported as numbering upwards of 200,000 men on each side were gathered in Hupeh and Honan provinces north of Hankow; President Chiang Kai-shek had established headquarters at Hankow; and conflicts on a major scale were in progress.

Sino-Soviet Negotiations Fail.—During the last week of October negotiations between China and the Soviet Republic over the Chinese Eastern Railway again fell through both at Manchuli and at Berlin, and according to the Nanking government, the Soviets showed no real desire to reach a settlement. In reality the Soviet government could scarcely be blamed for hesitating to negotiate with Nanking in the midst of civil war, and with the prospects that any weakening or breakdown in Central China would lead to an easier bargain with the young Manchurian dictator Chang Hsueh-liang.

With the approach of cold weather frontier hostilities quieted down, and the seven Russian gunboats which had been operating on the Sungari and Amu Rivers were withdrawn to winter quarters.

New Afghan Ruler.—Nadir Khan, former foreign minister under King Amanullah, was on October 15 proclaimed Amir of Afghanistan. The accession of Nadir, fourth ruler of his country within a year, came after a short campaign in which his followers captured Kabul and drove out the bandit usurper Bacha Sakao, who had held the throne for ten months preceding. Bacha and 1,000 followers surrendered a week later, and Bacha himself was afterward put to death. Nadir restored officials formerly employed under Amanullah, received congratulations from Amanullah himself, and two or three days later was officially recognized by the Soviet government.

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PIDGIN CARGO. By Alice Tisdale Hobart. The Century Company. New York 1929. $2.50.

REVIEWED BY CAPTAIN H. A. BALDRIDGE, *U. S. Navy*

Here is a book that all readers of the PROCEEDINGS will read with a great deal of pleasure and, should with the author's two previous books, be made available to the service in every naval library.

About the time of the Nanking affair in March, 1927, the reviewer, while editor of the PROCEEDINGS, came across Mrs. Hobart's first book, *By the City of the Long Sand—A Tale of New China*, written at Changsha, in the interior of China, at the head of Tung Ting Lake—the home of Yale-in-China. The reviewer was so impressed by her intimate and accurate knowledge of the Chinese and of the gradual political changes that had been and were taking place all over that distracted country and of the laying aside of the older traditions and customs, that special attention to her work was considered worthy of comment in the Secretary's Notes of the PROCEEDINGS. The first book was an interesting description of her various homes and servants covering a period of thirteen years, from the north of China to Changsha in the south.

Mrs. Hobart's second book, *Within the Walls of Nanking*, appeared in 1928, and was reviewed by the present writer in the January, 1929, number of the PROCEEDINGS. In this she tells the dramatic story of the siege of her husband's home on Socony Hill by the rioting Nationalist soldiers and of the escape of fifty-two American and British subjects through the aid of the barrage laid down by the American destroyers *Noa* and *Preston* and the British cruiser *Emerald*.

In the review of the above book it was said that Mrs. Hobart was well trained by travel and experience to know her subject (China) and that she was an unusually shrewd and trained observer, having gained for herself a place in literature and by new methods; that in addition to the above she has that sometimes unerring women's intuition that so often confounds the opposite sex; and that there was just a suspicion that she sensed many of the vital changes going on around her and all over China long before they were apparent to others high in commercial, political, and diplomatic posts.

That the above appreciation of her work was not extravagant has been more than justified by the comments now coming forth upon the work of this "new interpreter of China" by writers in the New York *World*, the Boston *Transcript*, the London *Times*, etc. Florence Ayscough, writing in *The Saturday Review of Literature*, says, "I think that she is the first writer to recognize the high office, the romantic appeal of international trade." The London *Times* adds: ". . . . Seldom has any writer shown such sympathetic insight into the minds of these pathetically patient, industrious Chinese."

Pidgin Cargo, Mrs. Hobart's third book, is a novel dealing with the pioneering of steam navigation on the upper reaches of the Yangtze River—from Ichang to Chungking—a distance of 410 miles of which about

200 miles are through the famous Gorges, the walls of which rise in places to a height 2,000 feet sheer from the water's edge. The current at times reaches seventeen knots.

Although this book is a novel it is based upon historical facts and the main character bears the same name as the American shipper Hawley, murdered at Wanshien, in 1924. Also are the familiar names of Little, Captain Plant, *U.S.S. Palos* and *H.M.S. Cockchafer,* dealt with in a manner that shows the author's familiarity with her subject.

The book contains a Prologue and is divided into five parts as follows: Part I—The River; Part II—Struggle; Part III—Achievement; Part IV—Banner Years; Part V—The River. It is dedicated to a "humble and unknown one of China's four hundred millions, My Houseboy, who at the risk of his own life rescued the manuscript of this book from under the hands of the looting soldiers in Nanking, March 24, 1927."

In Parts I and V are vivid descriptions of the River (Yangtze) with special reference to the Upper River and one can almost see with the Chinese their mystical belief in the utter futility of offending the river dragon and of man attempting to conquer it—the River takes and the River keeps. Part I introduces the main characters, Hawley and his wife, and their faithful Chinese servant, upon their departure from Shanghai for Ichang, where Hawley against premonitions of his wife and against the advice of friends, is determined to attempt the steam navigation of the Gorges. Mrs. Hobart's description of the home, the Hawleys' departure, the servants left behind, and the trip to the Bund, in the victoria with the *mafoo* on the box, bring back lingering memories of the old Shanghai—the Paris of the Far East. One single sentence in Part I will show how familiar the author is with everything she writes even while discussing ships. In speaking of the passenger steamer after clearing Shanghai she writes that "there was about the steamer the quiet and order which comes after a ship is well under way." How refreshing to know that one's author can "speak the language!"

Part II deals with Hawley's struggle to establish a line on the Upper River—his failure. He is known to the Chinese as the "Tiger." The Chinese have four tigers in their mythology—the yellow and black tiger, the black tiger, the white tiger, and the money tiger. The tiger is something to be afraid of, strong. The white tiger is bad luck and although Mrs. Hobart does not say so, perhaps the Chinese had this in mind when Hawley was dubbed the "Tiger."

Part III tells of Hawley's success and the birth of his son, who the father secretly plans and the mother fears, will succeed the father—and both be engulfed in the never satisfied waters of the River.

Part IV (Banner Years) is of the continuing success of the foreigners in the steam navigation of the Gorges, of the junkmen, the trackers through the Gorges, the education of the son in the States completed and of his return to Ichang.

One can see the big party of forty guests in the house at Ichang before dinner, all invited to greet the returning son and his bride. "What did you say?" shouted Eben (Hawley) to Margaret (his wife) from the depths of the pantry. "Can't hear you while I'm shaking this cocktail. Yes, I told you once. Of course the skipper of the *Palos* is to sit at your right. Yes, and Eileen at my right, even if she is my own son's wife. Who's giving this party, anyway? For once I'm going to have it my own way."

Part V tells of the Nationalist uprisings, of the war lords commandeering the foreign river boats, and of the tragic end of the river traffic so successfully built up through so many years of hard work.

Pidgin Cargo takes its name from the illicit opium cargo smuggled down the River from Szechwan Province in the river boats. It was a part of the "squeese" of the native deck hands and later the term was applied to any cargo that was smuggled on board that did not pay freight charges. Hence *pidgin cargo* is graft, corruption, dishonesty through the whole body politic.

The Navy meets American pioneers all over the world; men who go out with their wives and families to all of the out-of-the-way places—in the ports and in the interiors—that our foreign trade may ever be extended. There are plenty of Hawleys—Americans, British, Italian, French, German. It is in their blood and they can no more resist it than a bird can fly. And why not? It is life. And is life any different for the rest of us when *our* River takes us than it was for Hawley and the Chinese? "Strangely like The River, the yellow race who dwell upon her shores. Deep and se-

cret flows the life of the yellow race. Unmixable, proud, aloof. A separate and exclusive people."

THE ORDEAL OF THIS GENERATION.—Gilbert Murray, LL.D., D. Litt., F.B.A. New York: Harper and Bros., 1929. $3.00.

REVIEWED BY LIEUTENANT M. F. TALBOT, (S.C.) *U. S. Navy*

At a time when the question of the limitation of armaments occupies so important a place in the daily news, readers who realize the importance to our own country of developments in the international situation will welcome Professor Gilbert Murray's collection of "Halley Stewart Lectures" recently published in the United States under the title of *The Ordeal of this Generation.*

For a classical scholar, whose life, to use his own words, "has been chiefly devoted to keeping alive the beauty of a great literature that might otherwise perish," to attempt a discussion of international events might lead the reader to expect merely a repetition of familiar generalities on the ideals of brotherhood and peace. Professor Murray, however, both as a keen student of recent history and as one who has taken an active though minor part in the work of the League of Nations as a kind of intellectual ally of that most sincere of League workers, Lord Robert Cecil, writes with a thorough knowledge of the breadth and difficulties of his subject. His method of approach to the subject of war and peace is naturally predetermined by his unswerving faith in the ideas of international coöperation which center at Geneva. Though a sober discussion of international politics, the book is written with clearness and charm of style which copies in English prose the loveliness of the classics.

Professor Murray's thesis is in brief that the international system of the nineteenth century was inherently wrong, that despite a general advance in the condition of all men towards economic freedom and personal liberty, unlimited nationalism, with its corrolary that each nation is absolutely free to act in relation to every other nation as independent self-interest dictates, led inevitably to a struggle for power, to competing alliances for mutual defense, and finally to open competition in terms of armaments instantly ready for attack. But this he claims was changed in the winter of 1918-1919, the days of the "Great Repentance." An old order passed, giving place to new. To him the world politely created at Paris, despite its acknowledged faults, is the hope of years to come. "Profound changes," he writes, "political, social, economic, and intellectual have taken place in the environment of civilized man, and it is still doubtful whether or not he will succeed in understanding them and adapting himself to meet them. That is the ordeal. . . ."

To clear the ground for the consideration of modern war as an instrument of policy, the author devotes an opening chapter to war in general, in which he discusses those ideas, not unknown to the "wardroom argument," that war is the supreme manifestation, the struggle inherent in a world where all living things are constantly at strife, a point of view familiar enough to those who wish to review the German pre-war philosophy, the cult of power that found so complete an expression in the philosophy of Nietzsche, Treitschke's history, and the military writings of Bernhardi. In contradiction to these ideas, Professor Murray asserts that despite the admitted necessity of force to assure some measure of tranquility in areas of chronic political disturbance, the struggle inherent in life, demanding equally with war man's noblest effort, is not the conflict of man against man, nor nation against nation, but rather of civilized mankind in conflict with nature in order that he may have life and have it more abundantly.

The author then turns to a brief review of the nineteenth century, a period marked by gains in economic well-being and in individual freedom unequalled before throughout world history, yet marred by the sharp and menacing demarkation of conflicting nationalism, an age of conflicting currents, cooperation and conflict; and he asks what all who at times pause to speculate on the course of past events must ask themselves, was it inevitable that so much gain so dearly won should be swept away by war? Was there not something inherently wrong in the political system of Europe? To Professor Murray the answer is plain. The world lacked a political system which could coöperate against war. So "out of disaster rose inevitably the demand . . . . that the old system should be changed."

There follows a clear description of the League of Nations, the Covenant and its three principles, conference, law, and sanctions. Free from the somewhat vague and ponderous language which usually characterizes books on international relations, he presents a discussion of the League, its history, its problems, and the measure of success and failure that have attended its efforts. Especially interesting is his frank recognition of the two great dangers to the peace with which the League is powerless to cope, civil war and communism. Morocco, Syria, and China, more than the world outside the League, are names of ill omen, for unlike the Holy Alliance, self-appointed policeman against rebellion everywhere, the League takes no hand in the internal affairs of its members. But revolutions may easily become events of international moment, as witness that part of the Monroe Doctrine which calls a halt to any further attempt on the part of Spain to reconquer her lost colonies. And, to cite a more recent example, who can foretell what international complications may arise from the continued civil war in China!

Communism likewise is a threat against which the League has and can have no other policy than watchful waiting. War can do nothing but harm. It was war that gave birth to communism and its fanatic religion of world revolution. "It is ultimately a struggle between two systems and two religions: and that one will certainly win which is found to suit people best."

The concluding chapter on the special problems of the British Empire presents clearly the extraordinary development from Empire to the Commonwealth of Nations bound only by common allegiance to the Crown, and further brings out the dangers which confront not only the British Commonwealth, but all colonial powers as well, a war of races, a war of religions, and a war of crowded Asiatics, against those who hold vast tracts of empty land in trust for generations of white men yet unborn.

The author does not deny that force must be the final defense should a just and liberal colonial policy fail and arms be again necessary to preserve some vestige of the white man's established rights; but force, he hopes, is to be used not as a weapon of nation against nation, but as a bulwark of civilization against whatever may threaten.

But, alas, neither Chinese Nationalist nor Hindu fanatic will willingly accept a *Pax Britannica*, even in the sacred name of world order.

Force, it is admitted, is still necessary, but war must be avoided. Here, it seems, is the weak point in the argument. Given force organized on national lines in support of national policies, there is still the danger of war. What seems at first an imperial or a League problem, may readily become a world problem. Should any Asiatic power press the immigration question, purely a domestic affair to Australia, it becomes a matter of grave consequence, a possible cause of war.

And yet, wars of organized nations "hold hidden and incalculable dangers for victors and vanquished alike." No longer can they be limited to those "indecisive and temperate contests" of the eighteenth century, which the historian Gibbon saw as a harmless school for the European armies that might some day be called to defend civilization from a "savage conqueror issuing from the deserts of Tartary." With some satisfaction military men reflect that times have not completely changed and that today armies and navies may still be envisioned, not so much as definite armaments pitted one against the other, but rather as a symbol of the power of civilized nations against world anarchy.

A book so frankly facing the dangers which confront the world can not be put aside as mere pacifist propaganda. Rather it is a scholarly and sober discussion of international events, of the temper of the times, and of the largest questions which mankind must be prepared to answer. Naturally Professor Murray answers them in terms of his own national and international prejudice. Our own country aloof from the League yet coöperating with every movement that seems to give promise of world peace, secure in its defense and alone in sacrificing the actually completed weapons of defense, has played and, we believe, will continue to play an equal part in the preservation of peace and the defense of civilization.

INVESTMENT POLICIES THAT PAY. By Ray Vance. New York: B. C. Forbes Publishing Company, 1929. $4.00.

Reviewed by Lieutenant E. F. McCartin, *U. S. Navy*

We who go down to the sea in ships, and

"do business in great waters," are conceded to be rather inept when it comes to steering our frail financial barks in the shore-going waters of speculation. Perhaps it is because, associating as we do almost exclusively with our own kind, we have too great faith in human nature. Or perhaps it is because, seeing our friends on shore with apparently no greater intelligence or capacity than we possess amassing a fortune, we conclude that it is an easy and simple process. Whatever the cause, the fact remains, and there are probably very few of us who have not with a wry smile and a shrug of the shoulders charged off to experience a few hundred or perhaps a few thousand dollars painfully accumulated in long watches at sea and then hopefully sunk into a dusty oil well or a very watery stock.

To most of us, then, *Investment Policies that Pay* cannot fail to be interesting, and will probably be profitable. In his foreword the author says that the conclusions of the various chapters are largely individual judgments based upon personal experiences or observations. Very few of them are susceptible of demonstration by the statistical methods now so popular. The problem of investment has two sides: human beings on one side and stocks and bonds on the other. Our libraries are well filled with literature about the stocks and bonds; this book is essentially a study of the men and women who buy the securities.

This defines a purpose which is well fulfilled. Mr. Vance brings to his task the experience of years as head of a firm of investment counselors. The book is, above all, sane, and must clarify the complicated business of investment and speculation in the mind of the most casual reader.

The outstanding characteristics of the book are: the emphasis placed upon the "mission" and "general plan" of the investor as an essential of success; commonsense definitions and explanations of investment fundamentals; the absence of sleep-producing statistics; the absence of hard and fast rules.

The author is not writing of the prevailing trend of the stock market and readers with plans of obtaining wealth through speculation will profit little by this work, unless, as is probable, it induces them to forego speculation altogether, and to map out for themselves a sound investment policy.

COMMODORE DAVID PORTER, 1780-1843. By Archibald Douglas Turnbull. New York: The Century Company. 1929. $3.50.

Reviewed by Lieutenant Commander A. H. Rooks, *U. S. Navy*

When war was declared in 1812 the little American Navy was faced with a task which seems truly astounding in these days when we think so much of "parity," "5-5-3" ratios, and "control of the sea." That task was nothing less than to put to sea in the face of a British Navy consisting of 1,048 vessels aggregating 860,990 tons and 27,800 guns. Our own naval forces consisted of seven frigates and ten smaller vessels, amounting in all to 15,300 tons, with a total of 442 guns. The 5-5 ratio of today was 60-1 then. In spite of these odds we won a series of brilliant ship-against-ship victories, harried British commerce, and established even in most of our few defeats a tradition of hard fighting, boldness, and aggression which we hope our Navy will never forget. On the rolls of the service at that time were many gallant spirits who might have rivaled the feats of Blake and Nelson had the opportunity been offered them, and who deserve well of the Nation's tributes.

Among the gallant ones was Commodore David Porter. Mr. Archibald Douglas Turnbull has successfully accomplished a worthwhile task in presenting him to us in this biography, the first since that by Porter's son, Admiral David Dixon Porter, published in 1875. To read the life of such a man is to share in that life, to have it become a part of us, and to have in a measure personally experienced the passions and vicissitudes of the times. Thomas Carlyle once wrote: "History is the essence of Innumerable Biographies." Ten years later, excluding the lowly, he changed it to read: "The history of the World is but the biography of great men." I think his epigram is better in its first form. Porter was a distinguished man who accomplished much for the reputation of his country, even in losing his greatest battle. But his story would have been undistinguished without the "Innumerable Biographies" associated with it. If Porter made the crew of the *Essex* famous, they, no less, made him so. With sturdy American seamen he could accomplish much; with-

out them in Mexico he failed. This is their story, then, as well as his.

Mr. Turnbull's vivid narrative opens with Porter's escape from the British frigate in which he had been impressed; it closes with his twelve years' service as minister resident in Turkey. The intervening pages reveal him as a bold and daring spirit, a hard fighter, a restless seeker of hazardous enterprise, a naval officer finished in the arts of his profession by the harshest but best of schools. The publishers call him the Count Luckner of the War of 1812. He was twice impressed in British ships, and twice escaped. He was a midshipman under Truxtun when the *Constellation* captured *L'Insurgente*. He fought pirates on both sides of the Atlantic, and spent nineteen months as a prisoner after the *Philadelphia* grounded off Tripoli. He captured the first prize of the War of 1812. In the inadequately armed *Essex* he swept the Pacific, capturing enough prizes to make him the commodore of a squadron. He subdued the Marquesas Islands, and, dreaming of empire, annexed them to the United States. Off Valparaiso he lost his dismasted *Essex* to the *Phoebe* and the *Cherub* after a hopeless two-hour fight which his opponents declared "did honor to her brave defenders." He was on the Board of Commissioners of the Navy with John Rodgers and Stephen Decatur. He led a squadron against the West Indian pirates, and after one of the most extraordinary courts-martial on record, was convicted of disobedience of orders for what the court said was conduct motivated by "an anxious disposition on his part to maintain the honor and advance the interest of the nation and the service." (!) Resigning his commission in indignation, he was for a time an admiral in the Mexican Navy. Finally, he gave the Navy its first admiral, his adopted son, David Glasgow Farragut, and its second admiral, his son, David Dixon Porter.

That fight off Valparaiso is one that should be pondered well by every man who wears the uniform. When Lawrence took the unlucky *Chesapeake* out to fight the *Shannon*, he got a very advantageous position on the enemy's quarter. He surrendered that position to accept the *Shannon's* challenge to exchange broadside for broadside, and thereby lost his ship and his life. No captain of today would be justified in such chivalrous etiquette. But how about our present notions of international etiquette? When the British ships first entered Valparaiso harbor, they stood down on the *Essex* giving every indication of being about to attack, with the superiority on their side, and in spite of the violation of neutrality involved. By chance the tables were turned and the ships got into such a position that Porter could have blown the *Phoebe* out of the water. One word of command, and the mastery of the Pacific would have been his indefinitely, and the destiny of the United States in that ocean might have been profoundly altered. Yet he held his fire. The decision had to be made instantly. In the conflict between expediency and what international law declared to be right he must instinctively have chosen the latter. Later, when the British caught him in a disadvantageous position, they destroyed him, although neutrality should have protected him. Mr. Turnbull condemns him for that decision. He says:

> In the matter of personal reputation, the effect of sinking the *Phoebe* is no less evident. American historians would have given the question of outraging the neutrality of Chile as scant attention as it received from the British. We should have had a far different grouping of great naval names: Jones and Porter on the one hand; Hull, Bainbridge, and the rest on the other. The name of the *Essex* would have been cut quite as deeply as that of the *Constitution*, especially since the latter won her fame under more than one commander. Failing to triumph over impossible odds, the *Essex* did it with all the honors of war.

Commander Frost in *We Build A Navy*, thinks that Porter's decision was "a correct principle of Statesmanship, except possibly in some tremendous national crisis, which no one may judge in advance." We hope that such a crisis will never come, but if it does, it might be well to recall what happened to David Porter off Valparaiso.

Mr. Turnbull has approached his task with a thorough knowledge of the Navy and its language, customs, and moods. Altogether a very readable book, and one that should find its way on board every man-of-war in the American service.

Courtesy Robert W. Neeser

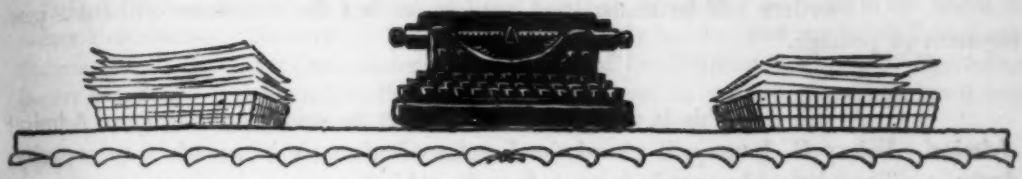
THE SECOND *ESSEX* IN ACTION ON THE MISSISSIPPI

David D. Porter, as an acting rear admiral, was in command of the U.S. naval forces operating up river from Vicksburg, while Admiral Farragut was in command of the naval forces below Vicksburg. The second *Essex*, in command of Commander William D. Porter, operated up river with Rear Admiral David D. Porter's forces until in an action with the Confederate ram *Arkansas* she was separated from Admiral Porter's forces and joined Admiral Farragut's forces down river.

From the original by Carl Becker at the Naval Academy

ADMIRAL DAVID D. PORTER, U. S. NAVY
The first President of the U. S. NAVAL INSTITUTE, 1873

SECRETARY'S NOTES



A Hectic Year

The year of 1929 has proved to be an amazing year for the Navy. Scarcely a day passed without its developments. As far as new construction went it was like the old shell game, "Now you see it and now you don't."

However, one principle has been firmly established in the public mind, the principle of parity in naval types of all kinds with the most powerful nation.

As usual, in situations like this, attacks in general and some personal were aimed at naval officers for their stand on the subject of national defense. But these attacks failed for the simple reason that no one can justifiably criticize naval officers when they insist that national defense is outside the field of barter and exchange.

The "disarm America first" organizations, taking much comfort out of the situation after having been completely repudiated by the action of Congress on the cruiser program, immediately took heart and went to work. Mr. Libby, executive secretary of the National Council for the Prevention of War, is quoted in the *Baltimore Sun* of October 28, as saying, in a speech at the finals of the "youth peace contest," that "many Navy men were preparing to knife him (the President) at the first opportunity." For one hundred and fifty years the Navy has served the country without knifing the President and it will not start now. We only have to go back a year to find where the National Council (with international objectives) endeavored to knife President Coolidge on his cruiser program.

The year closes without our having a 10,000-ton cruiser in commission. That is something to think about.

Institute Business

The year will find the Institute about as successful as last year. Our membership has increased but we doubt if it will be as big an increase as last year. In this connection, it is gratifying to note the way in which members are nominating their friends for membership. We hope it keeps up, for most new members come from this source.

Look over the list of new Institute publications for you will see some very interesting new books, especially in the technical lines. *Naval Auxiliary Machinery,* just out, has a large number of plates in colors which add greatly to the value of the book.

We hope you take advantage of our offer to help with your Christmas shopping. At least, we tried to make it easier for you in case you wanted books.

Send in your ballots for the officers for the Institute for the year 1930. They have been coming in large numbers so far and we hope the good work keeps up.

Keep us informed in case of change of address, and above all, keep up your interest in the Institute.

"Proceedings" can be forwarded

The following from the 1929 *U. S. Official Postal Guide* is quoted for information in connection with your copies of the PROCEEDINGS: "Mail matter of all classes addressed to persons in the service of the United States (civil, military, or naval) whose change of address is caused by official orders will be transmitted until it reaches the addressee without a new payment of postage."

Admiral Jones

At the time this is written, there seems to be some doubt if Rear Admiral Hilary P. Jones will attend the London Conference in an advisory capacity. The admiral has not been quoted on the subject.

Admiral Jones has rendered conspicuous service to his country for over forty-five years. If ever a man had the right to make his own decisions as to what he will do, he has that right.

Certainly no man better qualified can be appointed, no man can be appointed who inspires greater respect and confidence. Above all the swirl and mess of charge and countercharge as to the Geneva Conference of 1927, Admiral Jones stands out as a beacon light of courage and honesty of purpose.

If he does not attend the London conference, the Navy will feel sorry, for the admiral adds dignity, confidence and prestige to any body to which he may belong.

More about the "St. Mary's" and "Newport"

One of our associate members, Mr. Thomas L. Sullivan, invites attention to an omission in an article "The New York Merchant Marine Academy," published in the November issue of the PROCEEDINGS. He calls attention to the fact that in a list of commanding officers of the training ships the name of Lieutenant Commander Felix Riesenberg, U.S.N.R. was omitted. Lieutenant Commander Riesenberg was in command of the *Newport,* 1916-19, and again sometime around 1923-24. Mr. Sullivan feels that in view of the fact that the *Newport* was in an actual war status during a part of this time, operating in the neighborhood of Long Island Sound, special mention should have been made of this service.

He also calls attention to a paragraph in the Boston *Daily Globe* of May 20, 1929, which states that the bell of the schoolship *St. Mary's* was presented to the Church of the Immaculate Conception, of Brewster, where it now hangs in the belfry.

Seeing is believing

One ingenious Washington correspondent of a well-known newspaper intimates that naval officers are too insistent on the subject of the 10,000-ton cruisers, that we have never had any and therefore know nothing about their capabilities.

Now, that is a new way to look at it! It is true that we have never had any, but then we have had very few cruisers of any kind.

Still, there remains an idle curiosity about them, other nations have liked them so much that they have built and are building more; maybe we might grow to appreciate them. It is only fair to give us a chance.

Laying joking aside, why is it necessary to feed such rot to the public?

Psychology in the laboratory

In commenting on a book review, one of our members, Commander D. E. Cummings, U.S.N. has the following to say on laboratory psychology:

May I offer the following comments on the review of the book entitled *The History of Psychology*, on page 1009 of the November PROCEEDINGS:

It is, I think, somewhat of a novelty to find books on psychology reviewed in the Naval Institute PROCEEDINGS. However, it is a welcome and timely incident and one which I trust may happen again. Lieutenant Commander Rooks's review of Dr. Pillsbury's *History of Psychology* is very well done. It presents both the intent of the book and its relation to various naval matters in a very interesting manner. I have no exception to take to it.

However, it seems to me unfortunate not to complete the story by giving some ground for hope for the future in a matter of such vital interest to the practical work of the Navy. Being a historical work it would seem from the review that Dr. Pillsbury has, with perfect propriety and quite naturally, dwelt largely on historical aspects. The study of psychology was until relatively recently based on just such conflicting theories as are described by the reviewer. It may be remembered that chemistry was once in the same situation. Today, of course, chemistry is approached through the laboratory, where the various small details of actual experimental knowledge of what does occur under different conditions in the realm of chemistry are measured and observed and collected and organized into a systematized body of knowledge, from which a practice is built up such that chemistry has become recognized as one of the every day necessities of a vast variety of the activities of life. Precisely this same development is now occurring in the psychological laboratory. A visit to a good psychological laboratory would disclose the students paired off and working on very interesting experiments. In this place, one of the pair would be announcing a series of words on an instrument which closes a circuit when he speaks. The other of the pair would be responding with the word which most quickly occurred to him after hearing the one propounded by his team mate. His voice would close another circuit and the closing of these two circuits would measure accurately in thousandths of a second the time interval between the word and its response. A series of such experiments would show perhaps the range of variation in the responses of an individual and also the difference between the responses of one individual and another individual. Knowledge built up from such experiments as this constitutes the elementary chemistry of the psychological laboratory, and from these experiments there grow methods of procedure by which more complicated differences in individual response or capacity or aptitude are determined. When the range of these differences has been determined it is possible of course to tell who has the specific quality in higher degree. When the relation which this particular quality has to some practical activity of life is determined, the simple measuring of that capacity will give an indication of whether it is profitable for the individual to try to follow that activity. Thus psychology gets out of the realm of theory and into the realm of careful scientific analysis. This process may be said without too great error to have become widely practiced since the war. To the historian it is too new to constitute a large part of his history, but to one interested in the present day state of psychology it is a matter of the greatest interest as indicating that psychology now offers a sound, scientific approach to problems which affect us all.

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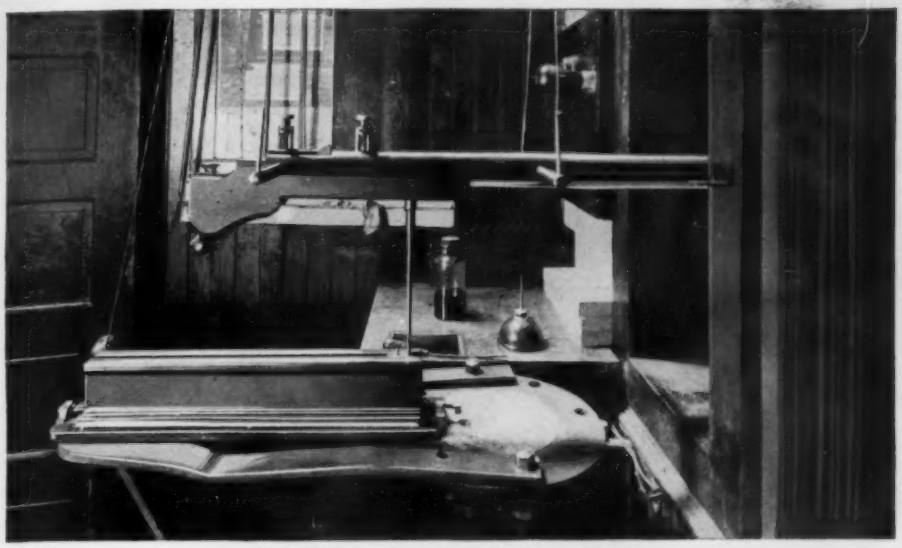

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$$\textit{Recoil Velocity of Gun} = \frac{\text{WEIGHT OF SHOT CHARGE } \textit{times} \text{ VELOCITY OF SHOT CHARGE}}{\text{WEIGHT OF THE GUN}}$$

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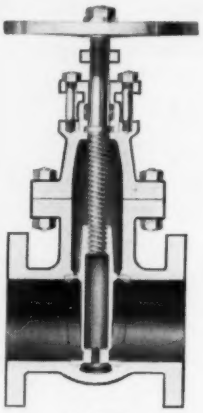

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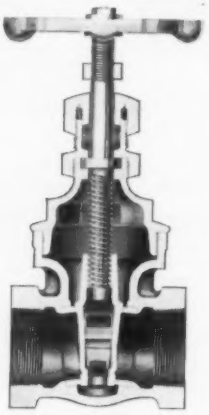

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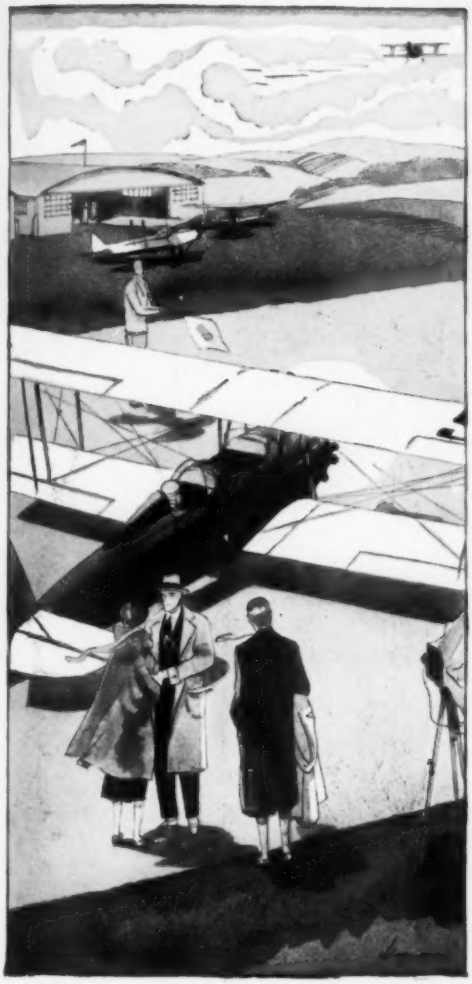

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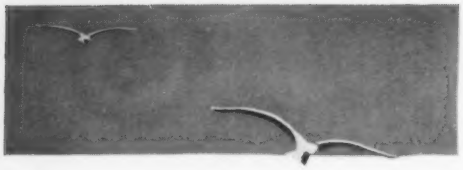

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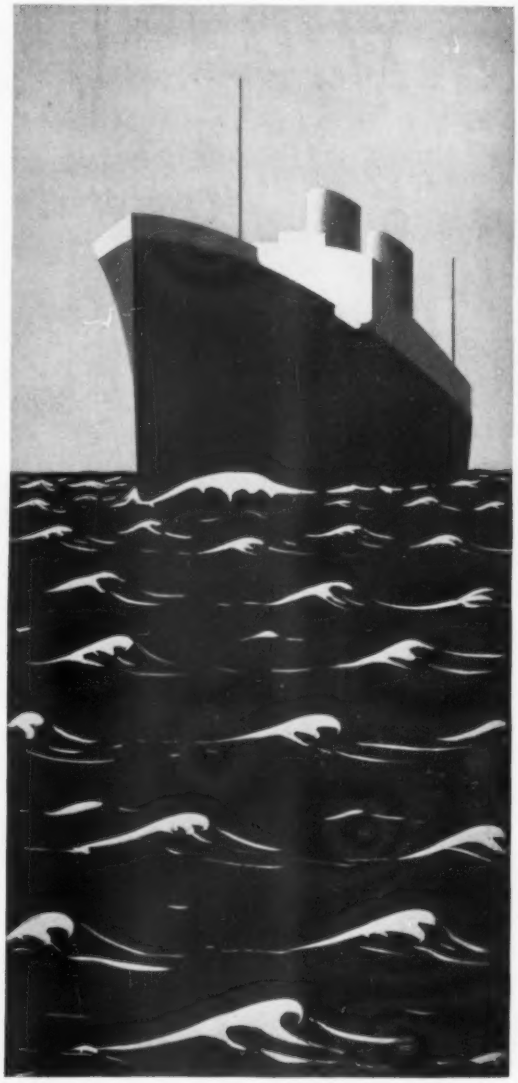

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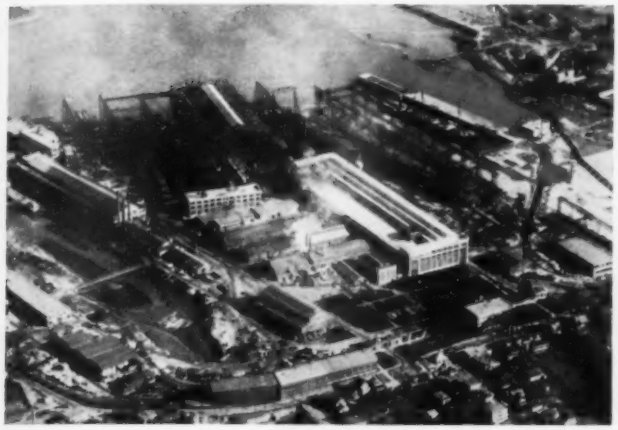

Left: Fore River Plant's shipbuilding facilities include 14 building slips and two wet basins capable of handling all classes of naval and merchant vessels. In addition Fore River Plant is particularly well equipped for making repairs to hull and machinery.

Below: 1020-ft. dry dock at Bethlehem's Union Plant, at Hunter's Point, on San Francisco Bay. This is the largest commercial dry dock in the country.

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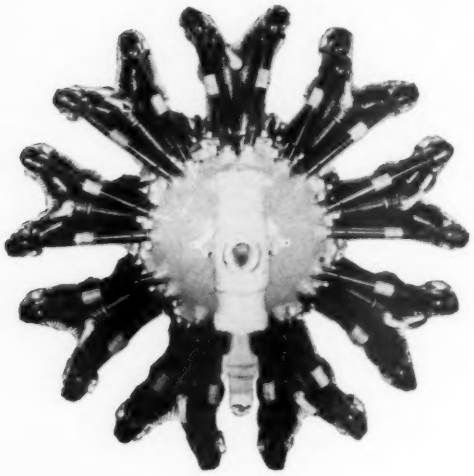

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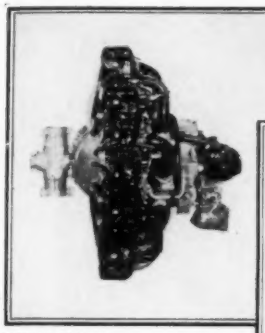

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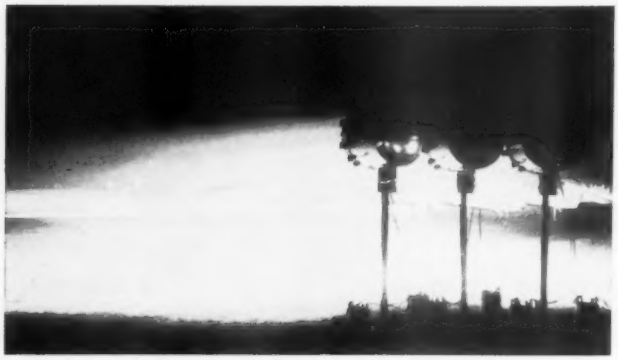

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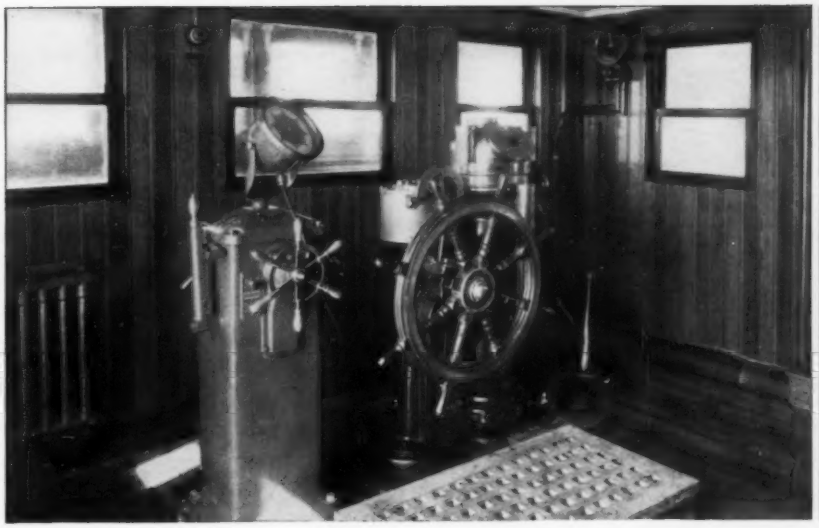

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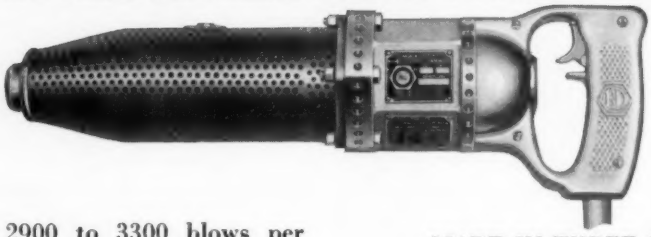

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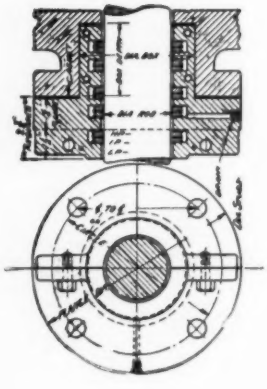

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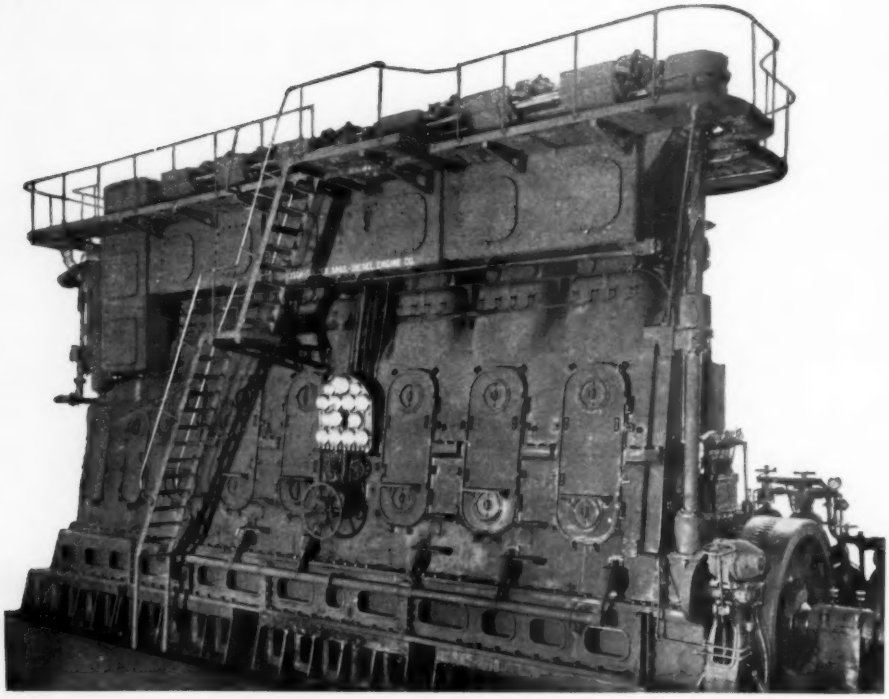

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